Chapter-I

INTRODUCTION

Background of the Study

Assessment is a general term that includes the full range of procedures used to gain information about learning and formation of values judgment concerning progress of students in relation to set standards (Linn and Ground, 2003). Assessment accomplishes students' purpose when they know what they are supposed to be learning, provides opportunity to receive regular feedback and know what is expected in order to meet each standard. The concept of assessment/evaluation is a changing phenomenon. Mainly evaluation is categorized into preparative (diagnostic), formative and summative - means evaluation to learning, evaluation for learning and evaluation of learning respectively (Ebel & Frisbie, 1991).

Grade is tool which measures the student's achievement. There are different types of grade such as standard-based, norm-based, absolute and relative. Different types Standards-based grading with formative assessments lets students know where they need to improve (Marzano, 2010). In standard based grading, formative assessment is a process of assessing students' achievement. Colby (1999) and Marzano (2010) agree that students take the time to learn the standard and to prove they understand the given standard should not be penalized for their earliest work. Formative assessment makes teachers aware of what standards the students are not meeting and how can they re-teach those standards (Marzano, 2010). Teachers know what is expected in order to help students make them reach to proficiency of standards. For this reason, assessments, assignments and tests are aligned to the standards and benchmarks (Hammond, 1997).

There are different techniques and methods for assessing student achievement. However, in schools mainly numeric scoring system and letter grading system are used to assess student's achievements. But nowadays, there is coming up the voice of alternative assessment system claiming that only testing cannot measure students' performance and competencies therefore needs to include other assessment tools and methods to assess all potentials of the students authentically at real life performance

to give fair judgment using letter grading system. Lack of proper use of assessment can cause injustice to the students and the number of fail would be increased.

In Nepal, mainly, many students fail in mathematics. In 2071 BS 52.27% students failed in SLC examination out of them 46.13% students have failed in compulsory mathematics (SLC Statistics 2015: OCE Sanothimi, Bhaktapur). Because of the failure in SLC examination, many students are stopped and blocked to get opportunity to study higher education and upgrade their professional and vocational career. For giving fairness, justice and proper reporting of student's competency, improvement in traditional assessment system is urgently necessary in Nepalese school education. Realizing this fact, the ministry of education has introduced letter grading in school education but neither this introduction was done with wider dissemination nor trained the teachers on how to implement and practice it in internal examination of school. The pertinent question now is how the concerned stakeholders do perceive this approach of assessing and reporting students' performance necessary for scale up to all schools at national level.

National and International Practices on Letter Grading

Historically, grading system was started in 1785AD from Yale University. In the world different university, colleges, schools have practiced and implemented grading system. Similarly, SAARC countries India, Srilanka, Pakistan have adopted grading system in school and colleges. In Nepal, Tribhuvan University, Kathmandu University and Pokhara University have practiced letter grading system in some faculty and school. From academic session 2070-071 TU has run semester system in Master's level in University Campus, Kirtipur and is practicing letter grading evaluation system instead of traditional percentage system. Similarly, Continuous Evaluation System (CAS) and Liberal Promotion Policy (LPP) is implemented at primary level and basic school level. But some teacher, parents and educationists have understood this system as 'no students fail' in primary level. Standards and meaning of CAS are misunderstood by some stakeholders. There are a lot of problems, misunderstandings and misconception about CAS and LPP. In this context, government has decided to implement letter grading system in SLC examination. If it is implemented without making appropriate plans, strategies and preparations, there may come hurdles and problems on the phase of implementation and this system may

not be fruitful and become unsuccessful. There is no letter grading systems in other grades except in SLC examination and neither in higher secondary levels. So, there arises a lot of questions about the validity and continuity of this system. Grading system in mathematics can give many cases of critical points that just in case of one or less than one score, one could be in higher or lower grade. So, much concern could be to the mathematics teachers, students and parents about the issues of letter grading system. Therefore, the researcher is interested to study the challenges and problems on implementation of letter grading system in SLC examination particularly in mathematics.

In Nepal, SLC board was established in 1990 B.S. however numeric system has been applying till now. Eight decades have been passed. There have been occurred a lot of reforms and changes in curriculum but comparatively less attempts for reform in evaluation system in secondary level. The existing pass fail evaluation system has created a lot of problems and drawbacks when SLC result published, every year some students commit suicide because of the failure in examination. Some says that SLC examination, that is conducted national wise, is an "Iron Gate" and some other say that SLC examination is a "Golden Gate". Some say that it is hard to pass the exam like as Iron Gate. It is difficult to attain success and be more laborious to pass the gate. But some other say that passing the SLC Examination is opportunity to go to new academic field. It gives chances to make their students' life brighter and successful and makes future golden. With many discourses created about SLC, at present time the SLC examination is being felt as "Iron Gate ".

SLC result 2071 shows 47.73 percentages of students passed SLC where in 2070, 2069, 2068, 2067, 2066, 2065 the pass percentage of students were 43.92, 41.57, 47.16, 55.50, 64.31and 68 respectively (OCE Report, 2015). It shows that the pass percentage of students is not increasing as expected although government forms many committees to study the reasons. The percentage of failure students in mathematics is 43.60 and 46.13 respectively in 2070 and 2071. This is really disappointing (MoE Report, 2015). The history of SLC result has been worsening from last 6 years. The percentage of pass student has been decreasing rapidly. The result of mathematics is very poor. To overcome the problems and drawbacks of existing pass fail evaluation system, Ministry of Education (MoE) and Curriculum

Development Center (CDC) have planned to change the existing evaluation system. Many committee and commission have presented suggestions and recommendations to the government to change the evaluation system and overall curriculum. Reforms in assessment system had been suggested by the task force formed on the chairmanship of former Vice-Chancellor of Tribhuvan University, Prof. Dr. Kedarbhakta Mathema on 2004 AD. This task force had suggested that grading systems should be used in SLC examination instead of numeric system. Mathema task force report has also suggested to consider only grade 10 curriculum for SLC examination and from 2063 questions have been asked from grade 10 only but SLC pass percentage has not improved (CDC Report, 2015). Despite all these efforts and attempts pass percentage in SLC examination has not improved. Depending upon the suggestions and recommendations of different research reports and international practices, National Curriculum Development and Evaluation Council (NCDEC) on 30 Ashad 2071 made theoretical decision and from 59th meeting of NCDEC on 24 Mangsir 2071 have decided to implement letter grading system in SLC examination to measure and evaluate students' learning outcome (CDC, 2015). This grading system has been prepared by the Curriculum Development Center (CDC) and passed by the National Curriculum Development and Evaluation Council (NCDEC).The grading scheme which was implemented on 99 technical and vocational schools in 2071 is given in the following table.

Table 1.1 Grading Scheme 2071

Score Interval (In Percentage)	Grade	Descriptor
90-100	A+	Outstanding
80-89	A	Excellent
60-69	B	Very Good
40-59	C	Good
25-39	D	Poor
Below 25	E	Very Poor

(Source: CDC, 2071 Mangsir)

There was not mentioned pass fail on mark sheet last year. No pass fail in a single subject. Instead of pass fail, grade was given to the student, which category s/he met.

Similarly, the Ministry of Education decided on 22 November, 2015 to introduce letter grading system in SLC board in all stream from this year. CDC had formed a nine member technical committee under the coordination of Diwakar Dhungel, Executive Director to prepare working procedure for the implementation of letter grading system. MoE has approved the 'Letter Grading System Implementation Procedure 2072' prepared by this technical committee. Letter grading system is going to implement in all stream, schools all over the country (MoE, 2072). But from this year instead of six levels, there are nine levels in grading. This new scheme is given below.

Table 1.2 Grading Scheme 2072

S.N.	Interval of Score(In Percentage)	Grade/Level/Class	Descriptor	Grade Point
1	90-100	A+	Outstanding	4.0
2	80-below 90	A	Excellent	3.6
3	70-below 80	B+	Very Good	3.2
4	60-below 70	B	Good	2.8
5	50-below 60	C+	Above Average	2.4
6	40-below50	C	Average	2.0
7	20-belw 40	D	Below Average	1.6
8	1-below 20	E	Insufficient	0.8
9	0	N	Non Graded	0

(Source: MoE, 2072)

There will not mentioned pass/fail on mark-sheet. Instead of pass/fail, subject wise and overall grade, grade descriptor will be mentioned on mark-sheet. If student getting grade D or below D in two subjects if interested to re-evaluate for getting upper grade, can improve his/her grade by giving re-exam by the decision of SLC examination committee but student getting grade D or below D in more than two subjects if interested to reevaluate can involve in the main examination of the next year. By evaluating through such process, certificate and mark-sheet will be given by including improved grade. In other level and classes, letter grading will be implemented in future respectively. Similarly, letter grading is maintained on continuous assessment system (CAS) which has already implemented on class 1 to 7 in school education (MoE, 2072).

So, far, OCE has been using numerical grading system from 80 years, while there exists four categories distinction, first division, second division and pass division to evaluate student's performance. OCE has introduced the letter grading system for technical and vocational stream in pilot phase last year (CDC Report, 2015).The OCE has stated, "The main motive/motto behind the introduction of letter grading is to eliminate the concept of pass fail. But expressed doubt that since this concept is not familiar with a lot of people, there might be some hindrances and challenges."

Diwakar Dhungel, executive director of CDC said,

> "Letter grading was introduced in the pilot phase last year under technical and vocational stream for students from 99 schools, which was largely successful. And as per the government's plan, the system will be introduced in all other stream from this year."

OCE has published the result of 3,256 students under the technical and vocational stream using letter grading system last year. Of the students appearing in the examinations, 215 students got 'A+', 779 students got 'A', 2,131 students got 'B', 124 got 'C' and one student got 'D' (OCE, TSLC Examination Report, 2015). It is seen from the report of OCE that most of the students got 'B' grade.

Ministry of Education (MoE) has decided to implement letter grading system in all stream from this year and stated that the main motto behind introducing letter

grading system in SLC examination was to avoid the use of words such as pass and fail. Still there are some challenges in the implementation of the new system as people do not have the knowledge of the new system. There arises a lot of questions about this new system such as: what are the pre-plans and preparations of MoE and CDC about the implementation of LGS? Whether it is appropriate or not? What is the equivalences of letter grades with percentage? Which category of students can access to which category of education after secondary education? Which category of students is fitted and can apply for which types of jobs in future? Does it solve the problems created by existing pass fail evaluation system? There is no fail system in this grading system, does it maintain the quality of education? Does it meet/maintain the national and international standards? What is the future of students getting grades at the end? Does Higher Secondary Education Board give admission to those students who secure last grades? Does international universities accept students who secure last grade in SLC? Does the existing physical and other infrastructure of higher secondary schools maintain to study all these students after SLC? More to these managerial and policy dimension related issues as well as pedagogical part is also important. Whether this system of evaluation motivates students to learn and gain efficiency in mathematics advancement. This has become a critical aspect in secondary education. Similarly, there arises the issues and questions about absolute vs. relative grading, marginal grade problem etc. to assess student's mathematical achievement and other subjects.

The Meaning Conveyed by Grades an Issue for Implementation

A grading system is primarily a method of communicating measurements of achievement. It involves the use of a set of specialized symbols whose meanings ought to be clearly defined and uniformly understood by all concerned. Only to the degree that the grading symbols have the same meaning for which it is used. Is it possible for grades to serve the purposes of communication meaningfully and precisely? (Ebel and Frisbie, 1991). But there are a lot of problems on grading. The problems of using grades to describe student achievement have been persistently troublesome at all levels of education. An important and fundamental reason why problems of grading are difficult to solve permanently is grading systems tend to become issues in educational controversies (Odell, 1950). Two major deficiencies of grades, as they are assigned in many educational institutions are: the lack of clear and generally accepted definitions of what the various grades mean and the lack of

sufficient, relevant and objective evidence to use as a basis for assigning grades (Stiggins, Frisbic, and Griswold, 1989). There is a great debate between absolute versus relative and letters versus numbers. Grades must be consistent, accurate, meaningful, honest, and fair and must support learning (Guskey, 2001; O'Connor, 2007). To say that grades need to be consistent means that performance standards need to be the same from teacher to teacher. Therefore, grades must be determined in a similar way and must be applied in the same way. This requires teachers to decide together what 'proficient' means (Guskey, 2001; O'Connor, 2007).To say that grades need to be meaningful means that they must communicate useful information to students and parents. Standard-based grades are not fixed. It is natural to start off with lower scores with an increase as the student continues to learn more about the standard. The score change, but the standard never changes (Tognolini and Stanley, 2007). Grades should be determined, not figured, by using professional judgment and a student's scoring tendencies (O'Connor, 2007). Standards-based grading gets rid of meaning less paperwork and meaningless homework. With this new reform every paper that comes from a student will have meaning and demonstrated they understood that standard (Scriffiny, 2008). Therefore, standards-based grades can be interpreted much easier than a single letter grade (Scott, 2005). "Fairness is much more about equity of opportunity that it is about uniformity."

Grading in mathematics should also be uniform, consistent, accurate, meaningful, and fair and depict the actual mathematical achievement of a student. In grading, there arises many problems such as: case of marginal grade, meritocracy, feeling of motivation and competition among students etc. Grading in mathematics means achievement of objectives and proficiencies among students determined by curriculum of mathematics. Grade is a mean to measure student's achievements and learning outcomes. So, grade in mathematics should explain and elaborate student's mathematics achievement, learning outcome in mathematics. Motivation to learn mathematics and feeling of competition among students in mathematics classroom affect grade of each students in mathematics. The main problems of using grading in mathematics is to describe and interpret achievement in mathematics and differentiate the capability, ability of students receiving same grade. Similarly, due to the habit of student towards score/percentage, it is difficult to address students hope, expectation and satisfaction on grade received in mathematics.

Statement of the Problem

Every year most of the students who appeared in SLC examination become fail. Among the different causes of failure in SLC examination, one of the main cause is failure in mathematics. Because of the failure in SLC examination, some students also commit suicide, get frustrated, become druggists, grasp negative path in life. Some students do not get access and are not eligible to higher study and other sectors because of the failure in SLC examination. Mathematics is considered as a significant subject in human life, however, most of the students are poor in mathematics and become failure in mathematics in SLC examination. The result of mathematics is very poor every year. The failure rate of students in mathematics is higher than other subjects in SLC examination. Most of the students think that mathematics is difficult subject, it is only for bright and talented students. Mathematics teachers themselves are introducing it as a difficult subject. The public image towards mathematics is, it is hard subject, only for talented and boys, girls cannot do well in mathematics. On the other hand, students are stamped as pass and fail in their head after giving 3 hour paper and pencil test. This single test may have inadequate evidence to prove someone is pass or fail. The causes of failure could be attributed to teaching approach, testing mechanism, faulty testing tools and overall assessment system. There is exam phobia among students at the time of giving examination. There is also fear and psychological pressure among students before and after giving SLC examination. The mechanism of evaluating students' needs to be realistic by defining different portfolios as part of education life.

Now Professors, educationists, policy makers, students, parents and teachers are arguing that the current pass fail evaluation system is not appropriate to reporting students' competency level. To bring reform in the evaluation system, a comprehensive techniques which is in preference and is being introducing is letter grading system. To solve the existing problems of school education system, letter grading was implemented on 99 technical and vocational stream schools in 2071 BS and Ministry of Education has decided to implement in both general and technical stream schools all over the country from 2072 BS. CAS is implemented in primary level but there is only negative look upon it. Letter grading theory and practice says, "It is done by the concerned teachers with system guidance." But until now it is not

known to the teachers. Public knowledge and acceptance on how their children are being evaluated/assessed and the students need to know how they are assessed, both of these groups are not familiar to the system of assessment for the system has not come publicly. Teachers training is not provided on using letter grading in school level. Only marks and percentage was converted to letters in mark sheet at last stage of preparing TSLC result last year but was not practiced in internal class and teacher made tests. Absolute grading is adopted not relative grading. There is no any description and provision to solve marginal case problem. The wider public awareness, training to teachers and students, mechanism of using letter grading into other grades/classes in school, influence in pedagogical reform and students learning habit improvement like matters are not in face. The other crucial issue related to mathematics achievement has not been discussed yet. The level of achievement in mathematics needs to be improved and all students need to consider math as opportunity not as threat in life only because of evaluation system. Nobody is stopped at SLC because of failure in particular subject. Mathematics should not become barrier to study further after SLC. Everybody should get access to higher education. Education should become life long, practical, vocational, technical, need based not only theoretical. For this, evaluation system should be facilitative and easy rather than controlling means of measuring student achievement.

Therefore, this study attempted to seek the answers of the following questions:

(i) What are the perceptual difference among mathematics teachers, students and parents about letter grading system in order to improve student's mathematics achievement?

(ii) How far the letter grading system motivates students to learn mathematics?

Objectives of the Study

Following objectives were formulated for this study:

(i) To find out the perceptual difference among mathematics teachers, students, and parents towards letter grading system in order to improve student's mathematics achievement

(ii) To analyze the effects of letter grading system in motivating students to learn mathematics.

Significance of the Study

The concept of the alternative education, alternative pedagogy and alternative measurement system formally appeared in 1968 AD at the first time. These alternative approaches introduced the ways, methods, measures of teaching learning and students' evaluation. According to the view of educationists and thinkers Ivan Illich, Everet Reimer and Paulo Freire, it is claimed that we are just wasting the students' time by making the compulsion of attendance in formal education (Simsjr, 2011). John Gardner claims whatever taught at the twelve years in existing formal education system can be taught at the two years if the compulsion of formal education is avoided and learners get chance to learn according to their own pace (Reimmer, 1971). The concept of alternative education allowed people to think about the alternative ways, methods, and measures of teaching, learning and evaluation.

In the context of our country, most of the children mainly from low economic background, minorities, lower caste, exploited, disadvantage, and endangered group still do not get access to the formal education. There is dropout problem in primary to upper level of schooling. Because of the failure in SLC examination some students commit suicide every year and some grasp negative path in life. A lot of students are stopped, blocked to further study because of the barrier of failure in SLC examination, most of them are from disadvantaged sections by one or other reasons. The investment of government has been becoming water in sand. Thus, government has decided to implement letter grading instead of existing numeric system to avoid the concept of pass fail. The letter grading system was implemented on TSLC in2071 BS and Ministry of Education has decided to implement this system in all streams i.e. general and technical from 2072 BS all over the country (MoE Report, 2015). But there are a lot of problems, issues on the implementation of letter grading system in SLC examination. Still there are some challenges in the phase of implementation of new system as people still do not have the knowledge of the new system. Although there are a lot of researches has been done about CAS, formative, summative assessment system etc. but nobody has yet carried out any research or study about letter grading system formally. So, the researcher was interested to do research on this topic. Exploration of perceptual similarities and difference among mathematics teachers, students and parent towards letter grading system in relation to improve

student's mathematics achievement and effects of LGS to motivate students to learn mathematics is the main significance of the study. The other significances of this research will be as follows:

- Unfold the hidden challenges, problems and issues for the practice of letter grading system in mathematics classroom and internal examination of school.
- This research is helpful to improve student's mathematics achievement by avoiding the misconceptions, misunderstanding, illusions and perceptual differences among mathematics teachers, students and parents towards letter grading system.
- This study becomes beneficial for secondary schools to improve student's mathematical achievement by motivating students to learn mathematics.
- This research helps MoE, NCDEC, CDC, OCE and other concerned bodies on the effective implementation of letter grading system in SLC examination.
- This research helps the policy makers, educators, and administrators to face challenges on the implementation of letter grading system in SLC examination.
- This research helps to solve confusions and problems on the implementation of LGS in SLC examination.
- This research helps for further research in the areas of LGS and alternative assessment system in SLC examination.
- This research is done on letter grading in mathematics in SLC examination. Whoever other scholars can do research about letter grading system in other subjects in SLC examination and other level by taking this research as a reference.

Delimitations of the Study

Delimitations are those characteristics that limit the scope and define the boundaries of study. The delimitations are researcher's control (Simon, 2011).This is a case study research about letter grading system to explore the perceptual difference among different stakeholders and student's motivation to learn mathematics. Therefore, this study is intended to limit itself to letter grading system in exploring perceptual similarities and difference among teachers, students and parents and students motivation to learn mathematics of purposefully selected case schools. It is

often heard that case studies, being idiographic, have limited generalizability (Yin, 2009). However, more pertinent is the claim by Robson (2002: 183) and Yin (2009: 15) that case studies opt for analytic 'rather than' statistical generalization. In statistical generalization the researcher seeks to move from a sample to the population, based on sampling strategies, frequencies, statistical significance and effect size. However, in analytical generalization, the concern is not so much for a representative sample. Indeed the strength of the case study approach is that the case only represents itself. A case is not a sample. There is a logical rather than statistical connection between the case and the wider theory. Yin (2009:15) makes the telling point that to assume that generalization is only from sample to population/universe is simply incorrect, irrelevant, inappropriate and inapplicable in respect of case studies. Generalization requires extrapolation and the case study researcher, whilst not necessarily being able to extrapolate on the basis of typicality or representativeness, nevertheless can extrapolate to relevant theory (Macpherson *et al*., 2000: 52) and, by implication, to the testing of that theory. (Cohen, Manion & Morrison, 2011).A part from this, a number of other considerations that set the limit of this study include the following:

- The study was limited to only two case schools, one public and one private school of Kathmandu district.
- Due to the nature of the data, the data are descriptive and not quantifiable. So this study was done as qualitatively with case study design. So, the findings of the study are not generalized but give understanding of the phenomena. Result may vary, if the study is done quantitatively with survey design.
- The case schools and all the respondents of the study were taken according to the researcher's purpose and convenience with nonprobability sampling. So, the finding and result is generalized for only those sampling techniques and may vary if sampling is done with probabilistic sampling.
- This study was limited on exploring perceptual difference among mathematics teachers, students, parents towards letter grading system and student's motivation to learn mathematics by purposefully selected

case schools. So, its findings would be generalized to only those selected schools and no more generalized to other schools.

- The data of this study was gathered by taking in-depth interview with purposefully selected students, mathematics teachers, parents, focus group discussion among groups of students and document, result analysis of TSLC 2071 of Janasewa Higher Secondary School. Thus, the result of the study is consistent and valid only for those tools and techniques. There would be differences in results when study is done differently.
- This study was concerned and limited to only mathematics achievement and student's motivation to learn mathematics of secondary level. So, the findings of the study can say something about this limited subject, level and may not be generalized to other subject and level.

Definition of Related Terms used in this Study

Assessment: The act of making a judgment about something or the act of assessing something. Assessment involves the interpretation of measurement data, usually in terms of whether or not an intended level of achievement has been achieved.

Existing Evaluation System: Pass and fail/ percentage/numeric evaluation system which have been practiced in SLC examination from last 80 years in SLC examination. In which there are predetermined four categories: distinction, first division, second division and pass division as well as pass and fail system.

Letter Grading System: A measurement and evaluation system which was implemented in SLC examination from 2071 BS in 99 vocational and technical stream schools and have planned to implement in both general and technical schools all over the Nepal from 2072 BS. In this evaluation system nobody fail and appropriate grade (letter) is given instead of pass fail, percentage, division.

TSLC: School Leaving Certificate examination in technical and vocational education**.**

Motivation: Inspiration, psychological uplift on students in learning, classroom participation etc. In this study motivation is used for student's inspiration, interest,

psychological motive, classroom participation to learn mathematics, feeling of competition among student in mathematics classroom, grade target, grade goal for SLC examination, mathematics teachers and parents encouragement to mathematics study, satisfaction level of students' with math teacher, study habit and homework, assignment done by students, extracurricular activities that was done by school to enhance mathematical knowledge, understanding competency.

Marginal Case: Problem arises when a student receive marginal score and grade that is approximate percentage or grade to the predetermined standard or limits but cannot secure/receive upper percentage or grade and is stopped to lower level, grade percentage.

Perception: Respondents' inner thoughts, believes, feelings about a particular event, situation, phenomenon, program, activity etc. Hence, it is related to letter grading system in mathematics achievement in school education.

Perceptual Difference: the measure of perceptual difference for this study means perceptual difference among mathematics teachers, students and parents towards letter grading in relation to improve student's mathematics achievement.

Effect of Letter Grading System: This means the change that results or the feeling that occurs among students due to the implementation of Letter Grading System.

Chapter- II

REVIEW OF RELATED LITERATURE

This Chapter is related with empirical literature, theoretical and conceptual framework of the study. A collective body of work done by earlier scientists is technically called the literature. Review of related literature is essential part of the research because it helps to identify variable relevant to research, to avoid the repetition and synthesis of prior works. It also determines the meanings and relationship among the variables (Singh, 2008). This Chapter includes the different features of article and findings of different researches in the field of mathematics education especially related to letter grading system, alternative education and assessment system. The main purposes of related literature is to develop some expertise in one's area to see what new contribution can be made, receive some idea for developing research design in a systematic manner by providing the general outline of the research study, and avoid the unnecessary duplication. This chapter deals with the works carried out in the area of this research project, theories and interpretation ever found. The literature reviewed were previous thesis, books, journals and internet resources.

There are two types of literature namely: empirical literature and theoretical. The empirical literature includes the different researches in the area of letter grading system, alternative education, alternative assessment system and theoretical literature for linking different genuine theories to solve the stated problem of the study about letter grading system in relation to perceptual difference among stakeholders and students motivation to learn mathematics.

Empirical Literature

Patrick Walsh (2015) prepared a paper work at department of economics, St. Michael's College Colchester, Vermont, USA entitled "Does competition among schools encourage grade inflation?" This paper considers whether high schools in competitive environments use grade inflation to attract and retain families, perhaps in addition to more constructive responses. Two measures of grade inflation are used: the cutoffs used by each school to assign a letter grade to a percent score; and high school GPA after controlling for test scores, a rich set of student and school characteristics and college GPA. Two measures of competition are used: the

enrollment-based concentration of school districts in metropolitan areas, and an instrument for this concentration. In both schools, increased competition significantly affects grade cutoffs: a one standard deviation increase in competition results in about a 0.12 to 0.18 standard deviation fall in the grade cutoffs. However, in both schools, competition does not significantly affect the actual assigned grades as measured by GPA. This pattern of results suggests that school administrators under competitive pressure may ease grade standards, but that teachers may re-adjust their scoring to leave actual grades relatively unchanged.

Kanaack, Kreuz & Zawiocki (2012), three teacher researchers conducted an action research project for the completion of their Degree of Master of Arts in Teaching and Leadership from Saint Xavier University entitled "Using Standards-Based Grading to address Students' Strength and Weakness". Teacher researchers conducted both parent and student surveys in addition to a teacher survey and interview. Through these tools, the teacher researchers found that students and parents alike agreed that they did not always understand why students received certain grades and were not able to identify their students' strengths and weakness. Parents were not confident in the teacher's abilities to explain grades. In an attempt to fix traditional broken grades, teachers sent home bi-weekly progress reports, detailing student progress. Participants included 138 students at the sixth and seventh grade levels at site A and 20 kindergarteners at site B, for a total of 158 students with 95 parents completing surveys. The research study was conducted from September 6th through December 9th 2011. Teachers then adapted lesson plan and teaching methods to help students improve upon a set of chosen state standards. Teacher implemented a new way of grading that did not allow outside factors to affect grades. In post documentation, teacher researchers found that 84% (n=114) of students agreed with the fairness of the grades that were assigned to them. This proved to the teacher researchers that when students knew what standards needed to mastered, they worked diligently to accomplish the goal set before them.

Michaelides & Kirshner (2005), conducted their research entitled "Graduate Student Attitudes toward Grading Systems". This study examined graduate student attitudes towards letter and pass/fail grading systems in the Law School and the School of Education in a Selective University in the United States. Fifty-four students

completed a questionnaire on goal- orientations (ability comparison vs. mastery) amount of effort and stress in each of the two grading environments. Students reported higher orientation towards ability comparison and higher levels of effort and stress in letter-graded classes. Gender, school, and mastery orientation differences were not significant.

Altan (2002) in his article "Assessment for multiple interagency" has stressed the need of assessment system continuously to promote teaching and learning in the classroom. The article assessment techniques which are useful to assess different skills, intelligence and behaviors.

Cicmanec, Karen Mauck; Johanson, George; Howely, Aimee (2001) presented a paper at the annual meeting of American Educational Research Association (AERA) entitled "High School Mathematics Teachers: Grading Practice and Pupil Control Ideology". Research supported by the Assessment Training Institute and the Ohio University School of Education. Survey data gathered from 230 respondents from a random sample of 500 Ohio public school teachers explores the association between teachers' practice of assigning grades based on non-achievement grading factors and teachers' pupil control orientation. Responding high school mathematics teachers provide information that relates to the use of non-achievement grading practices and their orientation to pupil control. Survey data, validated by interviews with teachers, suggest that the context of the classroom contributes more to shaping teachers' grading practices than the teachers' orientation to pupil control. Significant predictors are the proportion of at-risk students in the teachers' school District and the proportion of upper level mathematics courses. When a variable representing teachers' mean class size replaces school size in the regression equation that provides for block entry of predictor variables class size, the proportion of upper level mathematics course and the proportion of at-risk students, nearly 20 percent of the variance in grading practices is explained.

The findings of this research study indicates that the class size, percentage of at-risk students in the district, and the percentage of the teachers' assignment to upper level mathematics course account for approximately 20 percent of the variance in teachers' practice of assigning grades based on factors other than tests and quizzes. The grading practices of teacher's appear to be shaped by the context of their

classroom. Most teachers who directly answer free-response question on the use of grades to control students (53 percent) believe that final grades are not used to control student behaviors. Some teachers (36percent) believe that they might be used in this way. In contrast, eight percent of the teachers surveyed believe that grades are definitely used to control students. Teachers indicate that classroom management is one of the most difficult aspects of teaching. And written responses provide clues to issues that might support explanations of why teachers' assign final grades the way that they do. Major research findings were as follow:

- There is no significant association between teachers' practice of assigning final grades based on non-achievement grading factors and pupil control orientation when the prediction equation is adjusted for block entry of school size, the proportion of at-risk students, the proportion of upper level mathematics course and block entry of class size, the proportion of at-risk students, the proportion of upper level mathematic course.
- Simple correlations between the research variables suggest a positive association between the proportion of non-achievement grading factors used to calculate final grades and the proportion of at-risk students. Simple correlation suggest a negative association between the proportions of non-achievement grading factors used to calculate final grades and the size and academic level of the teachers' classes. Stated another way, the assignment of grades based on higher proportions of non-achievement grading factors is positively correlated with higher proportions of at-risk students. The assignment of grades based on higher proportions of non-achievement grading factors is associated with small classes and teachers who teach fewer upper level classes.
- For this study, the teachers' pupil control orientation provided a marginally reliable measure of pupil control orientation.

Airasion (1991) has discussed all the problems that appear in the classroom generally as to how they can be solved effectively, why the assessment should be done on the regular basis and so on. The book assists the teacher as how to conduct the classroom effectively, how to carry continuous assessment before, during and after the instruction, which techniques are useful for different purpose and so many other practical things are explained in the book in detail.

Arenz & Bohlin (1990) did the assessment system developed by the new standards project in the early 1990 consisted of "the mathematics portfolio assessment system assessed students' performance on extended work or investigation". This system provided a structure for assigning extended piece of work, rubric to evaluate them and examples for students to understand what is expected of them?

Theoretical and Conceptual Framework of the Study

Conceptual framework provides the information about the structure/content of the whole study based on the literature review and personal experiences. In other words it is the systems of concepts, assumptions, expectations, beliefs and theories that supports and inform the researcher. It is the key part of research study ("Glossary", 2014). The conceptual framework is the basis of investigator's research problem. Conceptual framework of the study is developed according to theories chosen for the study and the potential variables relation to an understanding. So, at first the discussions about the theory is presented the below.

Theoretical Frame for the Study

This topic focused on the discussion of the theory and ideas that are standing as the base to develop the steps and concepts of letter grading system. Not only this, this section deals about how the research questions are answered using these theories. In short, this section overall deals on the connection of the theory with research questions, research objectives and researcher's intuition and understanding towards the theory. Since it is a case study and of qualitative type research, so, a need of a theory is experienced to establish the research findings in valid way. Being the qualitative nature of the study, it is more useful to use the social learning theories to draw the actual results. To conduct the research on letter grading system in relation to perceptual difference among stakeholders to improve student's mathematics achievement and student's motivation to learn mathematics of secondary level school, though it is possible experimental and survey research using statistical approach. Due to the lack of sufficient time and resources as well as researcher's interest to know perceptions, believes, views of all stakeholders towards letter grading system in relation to motivate student to learn mathematics and improve students' mathematical achievement, this study was done in small section/area of school education upon purposively chosen two case schools of Kathmandu district. The perceptions,

believes, views, motivation are verbal responses, more subjective, difficult and impossible to measure numerically. So, it is hoped to be better to use the social theory to make interpretation of thick description. To achieve the stated objective of the study the following theoretical bases have been taken.

Maslow's Hierarchy of Need Theory

Maslow's hierarchy of needs is a theory in psychology anticipated by Abraham Harold Maslow in his 1943 paper "A Theory of Human Motivation" (Maslow 1943). Maslow consequently extended the idea to include his observations of humans' innate curiosity over the year's researches. Maslow's hierarchy of needs where the lower order needs (psychological and safety needs) may be linked to the desire and needs of low achiever in mathematics who only needs to pass mathematics or get safe from being failure in mathematics. Whereas highest order of needs (self-actualization) may be linked to the needs of most talented students in mathematics who get full marks or A+ grade and can solve each problem of mathematics easily and quickly. Maslow proposed a theory that outlined five hierarchical needs which could also be applied to mathematics education research and in mathematics classroom to motivate students towards mathematics learning. The researcher used this theory to find out the motivation of students towards Letter Grading in mathematics learning.

Maslow's hierarchy of needs and students' grade expectation/grade need in mathematics and in total in SLC examination. According to Maslow's theory, one does not feel the second need until the demands of the first have been satisfied or the third until the demands of the second have been satisfied and soon. Similarly a student does not hope or expect grade D in mathematics until s/he gets grade E, or grade C until grade D is achieved so on grade A+ until grade A is achieved. A student is always motivated to improve his/her achievements in mathematics. S/he always motivated to get higher score or grade in mathematics. The ultimate destination is to get A and A+ grade for self-esteem and self-actualization. There is a strong connection between Maslow's hierarchy of Need Theory and student's grade need or grade goal in mathematics in SLC examination. Student's mathematics learning is directly linked to his/her need, goal, and target of grade in mathematics, which also motivate student to his/her study. Low achiever in mathematics has lower need and higher achiever in mathematics has higher grade need. Less talented students in

mathematics are motivated to improve their mathematical achievement by attempting to get upper grade from lower level, while most talented students in mathematics are motivated to get highest or top grade that is A+ in mathematics for self-actualization and complete satisfaction.

Holland Theory of Career Choice

John Holland's Theory of career choice helps students to choose career, career path, choosing college and subject, training program or career that is a vital step toward success-grades, graduating on time and job satisfaction. The Holland theory is the best known and mostly researched theory on this topic. In our culture most people are one of the six personality types: Realistic, Investigative, Artistic, Social, Enterprising and conventional. Some refer to these as Holland codes or RIASEC. Career development is a "continuous lifelong process of developmental experiences that focuses on seeking, obtaining and processing information about self, occupational and educational alternatives, life styles and role options."(Hansen, 1976). This career development process is where an individual fashion's a work identity. The influences on and outcomes of career development are one aspect of socialization as part of a broader process of human development (Holland, Bandura; 1976).

In the context of Nepal Holland's Theory of career choice helps the students to choose subject, field and area of study after school education. This is directly linked to student's mathematical achievement and grade they received in SLC examination. After the school life, each student has different career choice, dream, ambition and goal. Holland's theory is helpful for interpretation of student's perceptions and attitudes observed. The career choice is also linked to study and learning mathematics at secondary level. Some student have a dream to become a doctor, engineer, pilot etc. For this mathematics is essential and important subject. They can study mathematics, science and technology after school education. They are highly interested in mathematics and science technology. So these types of students are motivated to mathematics due to their career needs and therefore could do hard study in mathematics in school level and mostly getting higher marks and grades. So this theory is directly and indirectly linked to student's career, mathematics achievement, interest and SLC result. In contrary, those students who are not interested in mathematics and get low mark/grade in mathematics have different career choice after

SLC. Such students do not wants to study mathematics and science. Their career is not mathematics and science. Their career goal may be language, arts, management, vocational education and training etc. It is not necessary and compulsory to study mathematics, science and technology after school education by all students. All student need not become a doctor, engineer, pilot and higher academic. There are multiple options in life, so in SLC no students is stopped by the barrier of failure in mathematics.

Pedagogical Alternatives in Schooling

In justifying and defending contemporary educational policy, educationists have drawn significantly two key theoretical influences: progressivism with John Dewey and Critical Pedagogy with Paulo Freire who wrote a book named 'We make the road by walking' and 'Pedagogy for liberation' (Upadhyay, 2067). Paulo Freire is the most influential man who brought the concept of the alternative school, alternative assessment and alternative pedagogy through his ground breaking treatise "Pedagogy of the Oppressed" in 1968. It was the fundamental book which allowed educationists to think about the alternative way of teaching and learning, alternative system of education and alternative system of assessment. Similarly Ivan Illich's "Deschooling Society (1971)" also brought the revolution in education system by challenging the existing educational system of that time. Another most recognized educationist who brought out the concept of alternative education system is Everett Reimer who published the important treatise named as "the school is Dead" in 1971 AD. In fact this concept of Reimer questioned about the existence of the school. These thinkers have presented the concept of the alternative education. This presents the concept of education which could be accessible to each people of the world. From where the concept of alternative evaluation system has also burn. There have been arising a lot of question about the existing evaluation system. The traditional pass/fail evaluation system cannot evaluate all aspects and potentials of students and create a lot of problems. So there have been arising the alternative assessment system.

Conceptual Framework of the Study

Before discussing the conceptual framework of the study, a brief discussion of the traditional and alternative assessment systems is necessary. The comparative framework of both assessment system is shown in following figure.

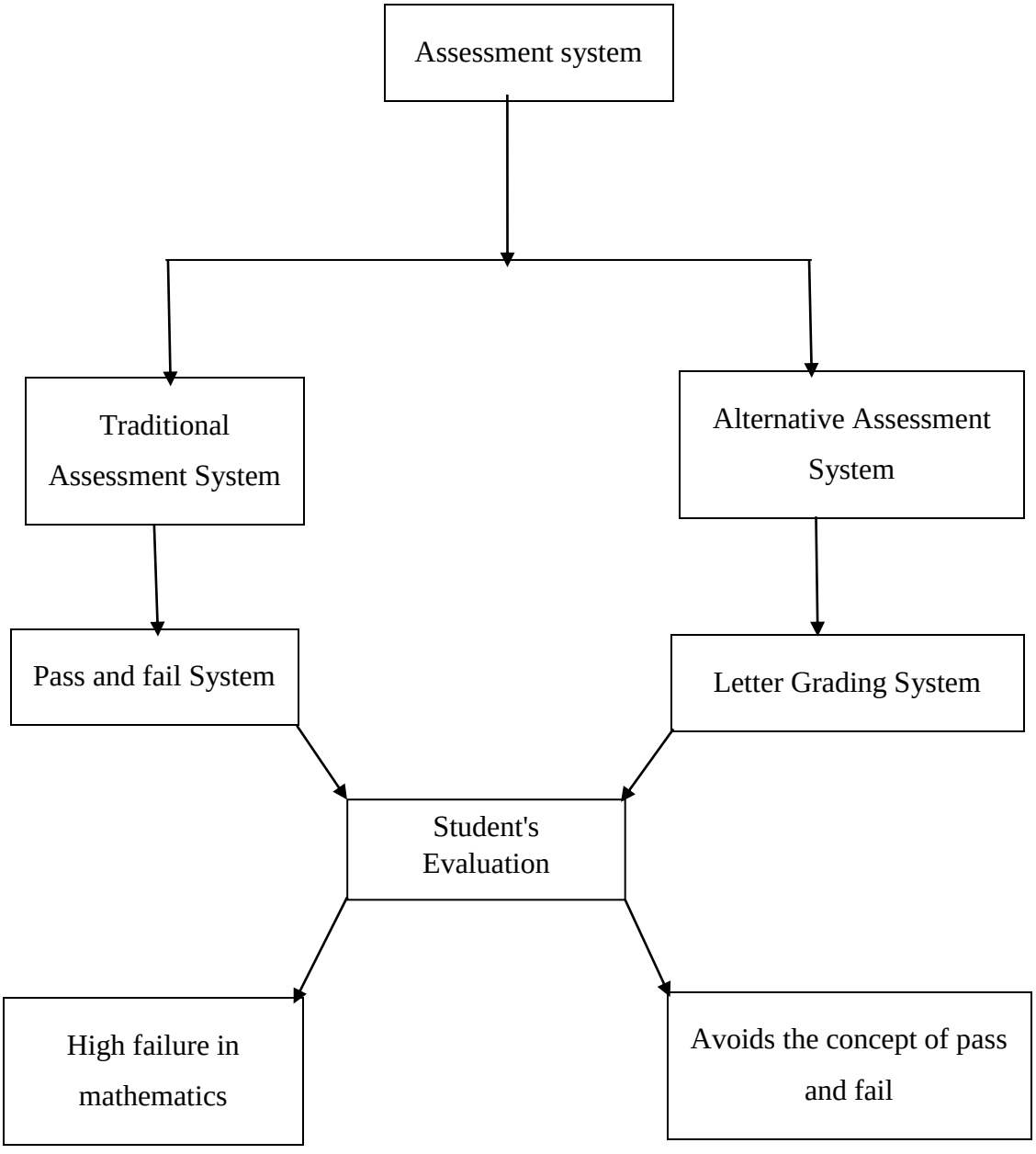

Figure 1. Comparative Framework of Assessment System

This diagram/figure categorizes assessment system in two categories: traditional/existing assessment system and alternative assessment system. Pass fail/ Percentage/numeric system which have been practiced till now since last 80 years in SLC examination is called traditional assessment system. Similarly, newly introduced letter grading system which was adopted/implemented in TSLC from last year in 99 technical and vocational stream schools and is going to be implemented in all streams i.e. technical, vocational, general from this year all over the country is an alternative measure of assessment system. The above figure connects the relation and compares between student's achievements in mathematics in both assessment systems.

According to the statistical reports published every year by Office of the Controller of Examination (OCE), there is seen high rate of failure in mathematics every year in SLC examination. Because of failure in SLC examination, a lot of students are stopped to study further education of their choice. Every year, some students also commit suicide, grasp negative path, become druggists, involve in different criminal activities in the life because of failure in SLC examination. To avoid such problem, Government of Nepal introduces new assessment system in SLC examination i.e. letter grading system, to avoid the concept of pass fail among students. According to CDC, in letter grading system nobody become fail but appropriate grade is assigned/given to each student in every subjects and in total based on his/her capability and potentiality. The researcher conceptualized this conceptual framework to explore the perceptual difference towards LGS among stakeholder in relation to improve students' mathematical achievement and effects of it on student's motivation to learn mathematics. Letter Grading System is not merely the process of converting marks and percentage into grades at the last stage in typing mark sheet. There are a lot of misconceptions, illusions and misunderstandings among students, teachers and parents about letter grading system i.e. nobody fails in SLC examination, everybody passes. But, it's not true. So, the researcher made the following conceptual framework about letter grading system to achieve stated objectives of the study.

The conceptual model for letter grading system for this study is shown in the following figure:

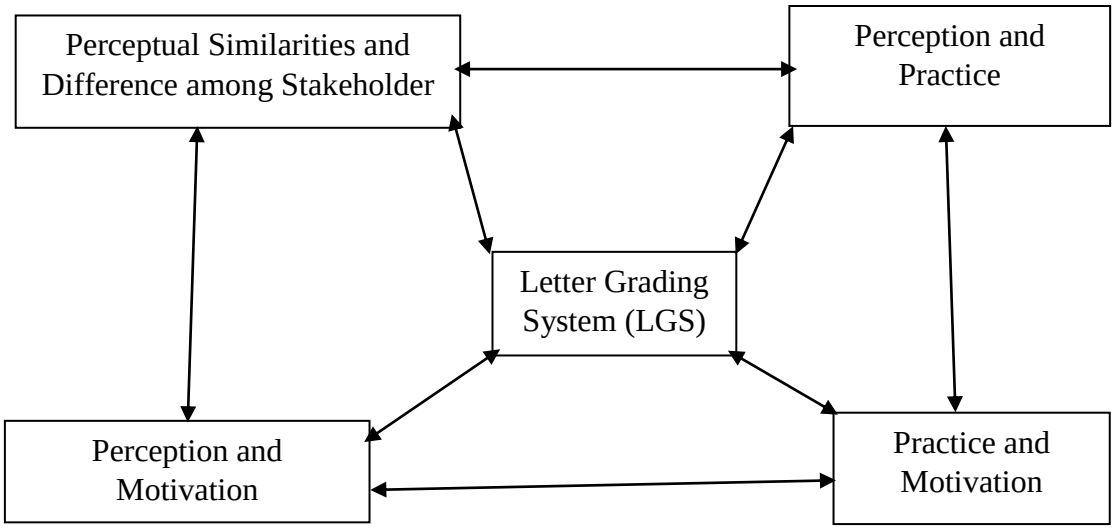

Figure 2. Conceptual Framework about Letter Grading System

This diagram/figure shows that there are perceptual similarities and difference towards the letter grading system among different stakeholders such as mathematics teachers, students and parents. Students are influenced and guided by Maslow's Hierarchy of Need Theory and Holland Theory of Career Choice. Different types of students have different motivational level to mathematics learning, different level of mathematical understanding and achievement. By connecting Maslow's Hierarchy of Need Theory, different types of students have different grade target/need in mathematics in SLC examination. Less talented students may satisfied with lower grade C, D, E and are motivated to get middle and upper grades in mathematics. Average students also may become satisfied with middle grade B, C and are motivated to get higher grade A. Similarly, most talented students in mathematics are totally dissatisfied with average and lower grade and hope for highest grade i.e. A+ in mathematics. In addition to grade goal and need, different types of students have different career choice after school education. By connecting Holland Theory of Career Choice, student's interest and need determine his/her future career. Talented, average, less talented students all do not have the same level of interest towards mathematics learning and motivation to learn mathematics. All students do not choose mathematics and science as their career in future. There are multiple paths of career.

So, the students should not stopped in SLC examination due to the failure in particular subject such as mathematics. All students should get access and opportunity to higher education or vocational/technical education. There should be the development of alternative education system which is need based, job oriented, career based, practical, vocational and technical rather than theoretical. All students do not understand mathematics in same degree and level taught by their teacher in school. In the existing education system, all the students are taught by the same methods using monotonous traditional pedagogy, which may be the main cause of failure in mathematics. Teacher should teach the students by using different methods, techniques, tools through modern pedagogy.

Similarly, the existing three hour paper and pencil test is used to measure all the students' learning abilities and outcomes in the same style through the same tools which is a prejudice, bias and partial judgment towards disabled and slow learners in mathematics. Students of different types, i.e. talented, average, less talented/weak and disabled in mathematics should be evaluated by using different measures of alternative assessment tools and techniques. In letter grading system, there may be different perceptions among teachers, students and parents which affect the students' mathematics learning and motivation. School practice of letter grading system may also affect the student's motivation to learn mathematics. Due to the lack of making letter grading system as everyday practice, there may be seen misconceptions, illusions and misunderstanding among students which affect student's motivation towards mathematics learning. Among mathematics teachers, there may be seen perceptual variations and differences due to the lack of knowledge, understanding and training about letter grading system which ultimately may affect in mathematics teaching.

Chapter-III

METHODS AND PROCEDURES

This Chapter described how the study was conducted to fulfill the objectives of the study, so methodology is the most important part of the research. This Chapter deals with procedure of the case study which was carried out to achieve the response of the problem. So, the researcher selected qualitative research for the study. This chapter gives the clear and concrete direction to answer the research questions and to achieve the objectives, because this chapter deals with the following topics:

- Design of the study
- Selection of Site schools
- Selection of respondents
- Data collection tools and techniques
- Validity and reliability of the data collection tools and techniques
- Data collection procedure
- Data analysis procedure
- Ethical Considerations in Qualitative Data Analysis

Design of the Study

The research design is the detailed plan of the investigation. In fact, it is the blueprint of the investigation. The researcher selects the research design to answer the research question objectively, rapidly and economically as it possible (Singh, 2008 p.450).

The research design of this study is a case study, descriptive and qualitative in nature. Case study research designs or approaches can be based on their function, characteristics or disciplinary perceptive. One's selection of a research design is determined by how well it allows full investigation of a particular research question. A case study is a specific instance that is frequently designed to illustrate a more general principle (Nisbet and Watt, 1984: 72), it is 'the study of an instance in action' (Adelman *et al*., 1980); it is the study of a 'particular' (Stake, 1995). Whilst Creswell (1994: 12) defines the case study as a single instance of a bounded system, such as a child, a clique, a school, a community, others would not hold to such a tight

definition, for example Yin (2009: 18) argues that the case study is a study of a case in a context and it is important to set the case within its context that is rich descriptions and details are often a feature of a case study. A case study can be both: sometimes tightly bounded and other times less so; as Verschuren (2003: 123) argues, it is ambiguous (Cohen, Manion & Morrison, 2011). Case study research methods allow researchers capture multiple realities that are not easily quantifiable (Hancock and Algozzine, 2006). Merriam (2001) suggests that case study research may be founded in ethnographic, historical, psychological or sociological orientations. Case study research designs include exploratory, explanatory and descriptive (Yin, 2003). Case study research designs may also be classified as intrinsic, instrumental or collective (Stake, 1995).

This study is a case study about letter grading system in order to explore perceptual similarity and difference among mathematics teachers, students, parents in relation to improve student's mathematics achievement and its effects on student's motivation to learn mathematics at secondary school. Letter grading system as an event is a case of the study and mathematics teachers, students, parents are respondents. This study is based on descriptive, analytic and explorative research design. It is descriptive because all expressed logic, believes, views and opinions obtained by respondents were subjective. It is analytic because all expressed views related to letter grading system about perceptual difference and student's motivation to learn mathematics in SLC examination were analyzed with the possible factors which are directly and indirectly attached to this topic. It is explorative because this research was focused to explore/explain the perceptual difference among the different stakeholders towards letter grading system in relation to improve student's mathematics achievement and its effects on student's motivation to learn mathematics.

Selection of Case and Site Schools

It is often the case in qualitative research that non-probability, purposive samples are taken. Whilst much of the discussion of probability samples is more relevant to quantitative research and whilst much of the discussion of non-probability samples is more relevant to qualitative research. In much qualitative research the emphasis is placed on the uniqueness, the idiographic and exclusive distinctiveness of phenomenon, group or individuals in question, that is they only represent themselves

and nothing or nobody else. In such cases it is perhaps unwise to talk about a 'sample' and more fitting to talk about a group or individuals. How far they are representative of a wider population or group is irrelevant, as much qualitative research seeks to explore the particular group under study, not to generalize (Cohen, Manion & Morrison, 2011).

The implementation of letter grading system as an event and process of evaluation system in school education is the case of this research/study whereas two schools of Kathmandu district, which were purposively selected are the case schools for this research/study. Letter grading system was implemented on 99 vocational and technical stream schools all over the country in 2071 B.S., among them, there is only one government school in Kathmandu district, Janasewa Higher Secondary School, Panga, Kirtipur. So, this school was purposively chosen for this study. Similarly, Panga Secondary School, Shahid Path, Panga, Kirtipur as private School where letter grading was not implemented last year was also chosen as researcher's convenience and purpose of the study.

Selection of Respondents

This study is based on qualitative inquiry. So the sample size in this study is not fixed. A case is not a sample (Cohen, Manion & Morrison, 2011).There is no any rule for selecting sample in qualitative inquire (Anderson 2001, p.123). So the sample size of this inquiry depends upon the researcher what s/he wants to know, what the purpose of the study, what can be the credibility of the study and what can be done with available time and resources. As one of the non-probability sampling techniques the researcher used purposive sampling to collect data/information which is necessary for the topic chosen.

This is a case study which tries to explore perceptual differences among mathematics teachers, students, parents towards latter grading system in order to improve student's mathematical achievement and student's motivation to learn mathematics at secondary level. According to the purpose of the study, the researcher used purposive sampling. The main respondents of this study were mathematics teachers, students and parents. The researcher made 4 groups of students including 8 students in each group. Students were selected purposefully and researcher's convenience. There were 37 students who were evaluated through letter grading

system in TSLC examination last year, 40 students are studying in technical and vocational stream and 45 students are studying in general stream in this year, too, in Janasewa Higher Secondary School. Similarly, 38 Students are studying in general stream education in class 10 in Panga Secondary School. The researcher made three groups from Janasewa Higher Secondary School, first group consisted students who passed TSLC last year, second group consisted students who are studying in technical stream in class 10 this year and third group consisted students who are studying in general stream in class 10 this year. Fourth group was made from Panga Secondary School from class 10 who are studying this year. The secondary level mathematics teachers, 5 parents from both schools were also selected purposefully and according to researcher's convenience as the main respondents for this study.

Data Collection Tools and Techniques

Data collection is important part of the study. To get the responses of the research questions/tools, the researcher gathers the required information by using such tools. On the basis of the collected data, we can study and analyze every part of the study. The validity of the study also depends on the tools which we used. There are many tools for the qualitative research to get the information from the people about their experiences, ideas and beliefs. In this study, the researcher intended to find out the perceptual difference among stakeholders towards letter grading system and student's motivation to learn mathematics. For this, the researcher needed to collect perceptions, beliefs, and views of mathematics teachers, students and parents towards letter grading system in relation to student's motivation to learn mathematics. To collect data for this case study, the following main tools were used.

Documents and Records of School about Result of TSLC 2071

Result of technical and vocational stream of Janasewa Higher Secondary school of TSLC 2071 BS, mark ledger, mark sheet of students and other related documents were also consulted to collect data.

Interview Guideline

According to Lokesh Koul, "Interview is a process of communication in which the interviewee gives the needed information verbally in face to face situation." The interview is in an oral questionnaire. Instead of writing the response, the subject or

interviewee gives the needed information orally and face-to- face or via the telephone. (Best & Kahn, 2009). The interview is a flexible tool for data collection, enabling multi-sensory channels to be used: verbal, non-verbal, spoken and heard (Cohen, Manion & Morrison, 2011). Interview is a method of gathering information by talk, discussion or direct question. The purpose of interview is not only to collect superficial details about the interviewee but also to prove the inner life of the interviewee. The interview guidelines for mathematics teacher (given in Appendix-A), students (given in Appendix-B and C) and those for parents (given in Appendix-F) were constructed. Face to face in-depth interview was taken with purposively and conveniently selected secondary level mathematics teachers, students and parents of both schools.

Focus Group Discussion Guideline

Unlike, the group interview, the group discussion stimulates a discussion and uses its dynamics of developing conversation in the discussion as the central source of knowledge. (Flick, 2006). Participants tend to provide checks and balances on each other which weeds out false or extreme views. The extent to which there is a relatively consistent, shared view can be quickly assessed (Patton, 1990). The focus group discussion(FGD) is a rapid assessment, semi-structured data gathering method in which a purposively selected set of participants gather to discuss issues and concerns based on a list of key themes drawn up by the researcher. To make discussion effective, participants should be kept on round, rectangular, or U- shape table. One or two hour discussion among participants is done. The group should be homogeneous but ideas, feelings, thoughts, perceptions and tendency of participants should be different. Information are recorded on tape recorder, videorecorder or noted in field note. According to Morgan, there may be 4 to 12 participants for focus group discussion but group involving 6 to 8 participants is best. If less than 4 participants are involved in focus group discussion, there is not sufficient interaction, and discussion and in result, sufficient information about research problem do not receive. Similarly, if in a group more than 12 participants are involved, then the group cannot be well managed and become fragmented. (Cohen, Manion and Morrison, 2007). So, size of a group should be 4 to 12. Besides this, it is not sufficient to discuss in only one group to receive/gain sufficient information. So, to receive detailed information, discussion

should be done among 3 to 4 groups. After that, triangulation should be done among information received from different groups to come at concrete conclusion.

Following the requirements of a good focus group guideline, the researcher prepare the guidelines based upon the themes/issues related to letter grading system with background information about the overall assessment system/evaluation system used. The discussion themes were: preference of letter grading system, understanding regarding letter grading system, learning motivation, expectation on the part of the students like major categories. Focus Group Discussion Guideline (given in Appendix-D, E) was constructed based on research problem, objectives, literature review and selected theories for the study. The other points could be raised on the process of discussion as probing and a hint is given in each theme.

Validity and Reliability of the Data Collection Tools and Techniques

Reliability and Validity are essential to the effectiveness of any data-gathering procedure. Reliability is the degree of consistency that the instrument or procedure demonstrates: Whatever it is measuring, it does so consistently. Validity is that quality of a data-gathering instrument or procedure that enables it to measure what it is supposed to measure. Reliability is a necessary but not sufficient condition for validity. That is, a test or tool must be reliable for it to be valid, but a test or tool can be reliable and still not be valid. (Best &Kahn, 2009). Whilst case studies may not have the external checks and balances that other forms of research enjoy or require, nevertheless they still have to abide by canons of validity and reliability (Cohen, Manion & Morrison, 2011). In interviews, inferences about validity are made too often on the basis of face validity (Cannell and Kahn, 1968), that is, whether the questions asked looks as if they are measuring what they claim to measure. One way of validating interview measures is to compare the interview measure with another measure that has already been to be valid. This kind of comparison is known as 'convergent validity'. If the two measures agree, it can be assumed that the validity of interview is comparable with the proven validity of the other measure. Perhaps the most practical way of achieving greater validity is to minimize the amount of bias as much as possible. The sources of bias are the characteristics of the interviewer, the characteristics of the respondent and the substantive content of the questions. More particularly, these will include: the attitudes, opinions and expectations of the

interviewer, a tendency for the interviewer to see the respondent in her/his own image, a tendency for the interviewer to seek answers that support her/ his preconceived notions etc. (Cohen, Manion & Morrison, 2011). The purpose of interviewing is to find out what is in or on someone else's mind. The purpose of open-ended interviewing is not to put things in someone's mind but to access the perspective of the person being interviewed" (Patton, 1990 p. 278). Validity is a greater when the interview is based on a carefully designed structure, thus ensuring that the significant information is elicited (content validity). The critical judgment of experts in the field of inquiry is helpful in selecting the essential questions. (Best & Kahn, 2009). So, the necessary advice and suggestion of supervisor as an expert on mathematics education and research were also considered by the researcher to ensure the content validity of the tools while constructing the tools.

Triangulation is a powerful way of demonstrating concurrent validity, particularly in qualitative research (Campbell and Fiske, 1959). Combined levels of triangulation and theoretical triangulation was used to insure validity of tools and techniques of this study. Data triangulation was done among the data collected from interview schedule, focus group discussion guideline and school documents to ensure concurrent validity. Reliability, or consistency of response, was evaluated by restating a question in slightly different form at a later time in the interview. Repeating the interview at another time may provide another estimate of the consistency of response (Best & Kahn, 2009). So, to maintain the reliability of interview schedule and focus group discussion guideline the researcher asked the same question at the start and end during the period of data collection, match the views, which insure the consistency in result.

Data Collection Procedures

One of the important and essential step of research is data collection procedure. To collect the data, the researcher went to the case schools by administrating the interview guideline for mathematics teachers, students, parents and FGD Guideline for students groups. So, at first, the researcher established the rapport to the school authority and mathematics teachers by introducing researcher himself and stating the purpose and process of research. According to the purpose of the study, firstly, the researcher requested with the school authority for the records of

TSLC result 2071 of Janasewa H. S. School and received it. After that, the researcher asked for permission to carry out the research. After getting permission, the researcher visited the mathematics teachers and students, introduced researcher himself and requested them for their help.

To achieve the objectives of the study, the researcher formed four groups i.e. three groups including one group of technical stream who had already evaluated through LGS last year, another group who had been studying in technical stream this year and remaining one was also studying in general stream this year in Janasewa H. S. School and fourth group was formed from Panga Secondary School which had been studying in general stream this year. After that, the researcher conducted focus group discussion among those groups of respondents, each consisting 8 members. Group were homogeneous in some characters such as class level, school type, stream of education etc. Participant respondents were kept on U-shape table and one hour group discussion was done among them on the research topic and problem. The role of moderator and note keeper was done by the researcher himself. For this, Focus Group Discussion Guideline (given in Appendix-D, E) was constructed based on research problem, objectives, literature review and selected theories for the study was used. In each group, the themes for the focus group discussion were about students' motivation, believes, perceptions, thoughts towards letter grading system in mathematics. The FGD Guideline was used while conducting the group discussion among students' group to explore their perceptual similarities and difference towards LGS in relation to improve mathematics achievement and to find out the effects of LGS in motivating them to learn mathematics. The records of FGD among students was collected carefully. The information/data received from FGD was recorded in audio form in mobile phone and also noted in field note by taking permission from participant respondents. Likewise, in-depth interview with secondary level mathematics teachers and those selected students for group discussion of both case schools was conducted with the help of interview guideline. The researcher also visited the parents of those selected students' at their home through phone contact and in-depth interview was also taken with the parents. The conversation with those respondents were recorded in audio form in mobile phone, listened carefully and noted in field note in the time of interview. Finally, the researcher thanked to all the

respondents to whom he consulted and school authorities of both schools for their kind co-operation.

The data collection was done from 6thAshojto 25thAshoj 2072 at Janasewa H.S. School and one week at Panga Secondary School. Data was collected before the approval of 'Letter Grading System Implementation Procedure 2072' by MoE. At the time of data collection, there was not any official decision about the implementation of letter grading system all over the country in all stream. So, the data may be influenced by time period and findings and conclusion may too.

Data Analysis and Interpretation

Data analysis is considered to be important step and heart of research in research work. After collection of data with the help of relevant tools and techniques, the next logical step is to analyze and interpret data with a view to arriving at empirical solution of problem (Singh, 2009). The data analysis for the present research was done qualitatively.

Ways of organizing and presenting Data Analysis

In the book Research Methods in Education written by Louis Cohen, Lawrence Manion & Keith Morrison (2011) described seven ways of organizing and presenting data analysis: the first two methods are by people, and the next two methods are by issue or theme, the fifth method is by instrument, the sixth is by case studies and final method is by narrative account. In this research only one methods was not used, rather there was used almost all methods due to the depth, wideness, comprehensiveness and completeness of the study. Data collected by using interview guideline, FGD guideline, and school documents were analyzed and interpreted verbally not numerically by making themes or codes. The collected information/data from interview was categorized according to the category of the respondents.

More elaborately to explore the perceptual difference and similarities towards letter grading among mathematics teachers, students, parents and student's motivation to learn mathematics at first researcher again listen carefully all the audio records of data on mobile phone after the collection of data besides the field. The researcher transcribed all the oral, verbal expressions, views, perceptions as well as gesture of the respondents in written form that were listened from audio records and also from

field note. After then original data are translated in English language for convenience. Some valuable and important narration were not altered, translated and kept in original form. After these process, the researcher made essential codes, categories and subcategories. A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, silent, essence-capturing and evocative attribute for a portion of language based or visual data. Coding is the transitional process between data collection and more extensive data analysis. Coding process summarize or condense data, not simply reduce data. Coding is not just labeling, it is linking, and it leads the research from data to idea and from idea to all the data pertaining to that idea. Theme is a phrase or sentence describing more subtle and tacit process (Saldana, 2009). Descriptive, vivo, analytic and narrative coding were used to code data gathered/collected. From the same codes and categories researcher drawn the essential themes. Then similar themes/concepts were kept in one place where different information/themes were kept in one. To arrange the theme and concept, theory under the study were used.

Mainly, data were analyzed according to the categories of students, teachers, parents and schools. Those different themes such as career choice of student, motivation to learn mathematics, study habit, homework/assignment done, satisfaction with math teacher, assistance from parents, home and school environment, perception towards letter grading, grade goal/target for SLC examination, student's grade need, future career, subject of interest, mathematics easy or hard, letter grading vs. percentage system, quality maintained by letter grading, measures to solve marginal grade problem, feeling of competition among students to learn mathematics, extracurricular activities at school that helps mathematics learning, perceptual similarities and difference were used as the categories of analysis the text of interview and focus group discussion. After that similar themes/concepts of the respondents were explained and analyzed qualitatively/descriptively by using Maslow's hierarchy of Need Theory and Holland's Career Choice Theory.

Ethical Considerations in Qualitative Data Analysis

The qualitative data analysis frequently concerns individual cases and unique instances and may involve personal and sensitive matters, it raises the question of identifiability, confidentiality and privacy of individuals. Whilst numerical data can

be aggregated so that individuals are not traceable, this may not be the case in qualitative data analysis, even if individuals are not named or are given pseudonyms. The researcher has an ethical obligation to reflect on the principles of non-maleficence, loyalties, beneficence and to ensure that the principle of *primum non nocere* is addressed-do not harm to participants. (Cohen, Manion & Morrison, 2011). Qualitative data may be sensitive or personal, the researcher do not only need to consider who perform any transcription, but the ethical conditions to which the transcriber must be subject

Interviews have an ethical dimension; they concern interpersonal interaction and produce information about human condition. Though one can identify three main areas of ethical issues-informed consent, confidentiality and the consequences of the interviews. These need to be 'unpacked' a little, as each is not unproblematic (Kvale, 1996). Who should give the informed consent (participants or their superiors) and for whom and what? How much information should be given and to whom? What is the legitimate private and public knowledge? How might the research help or harm the interviewees? Does the interviewer have a duty to point out the possible harmful consequences of the research data or will this illegitimately steer the interview? It is difficult to lay down hard and fast ethical rules, ethical matters are contestable (Cohen, Manion & Morrison, 2011). Denzin and Lincoln put three ethical issues/guidelines: consent, right to privacy and protection from harm. (Denzin and Lincoln, 2005). Although, this research was carried out with the full consent of all selected respondents and schools, the researcher used the nick name of each respondent instead of original name due to the privacy and personal matter of respondents. Because of privacy, name of students and their parents mentioned in this research are not original, pseudo name/nickname of students and their parents is mentioned. Similarly, name of mathematics teacher is not mentioned in the research but schools name is original and is not changed or altered.

Chapter- IV

ANALYSIS AND INTERPRETATION OF DATA

This Chapter deals with the analysis and interpretation of the collected data. Analysis of data is a process of inspecting, cleaning, transforming and modeling with the goal of highlighting useful information, suggestions, conclusions and supporting decision making (Best and Khan, 2009). Data analysis is considered as an important step and heart of the research in research work. The most important part of the study is to analyze the collected data because without analyzing the data, the essence of the study cannot be found. While analyzing the collected data, the investigator interprets data, draws conclusions and makes generalizations (Upadhyay, 2001). After the collection of the data with the help of relevant tools and techniques, the next logical step is to analyze and interpret them with a view to arrive at empirical solution to the problem. The data of the present research work was analyzed analytically, descriptively and qualitatively.

There are different measures and methods to assessor evaluate student's achievement. Mainly, all over the world, there are numeric and grading system practiced from past to present. But there are different other tools and methods of alternative assessment too. Mainly in our country Nepal, from the beginning of formal education system there was used pass fail system in every level of schooling or education. In this system, there is predetermined standards, borders of pass fail and students are only evaluated in numeric scores and percentage through three hour paper pencil test. So, it is argued that three hour paper pencil test cannot measure actual capacity, capability and potentiality of students. A lot of students are dropout from school education and stop their further study because of the failure in SLC examination. One of the great cause of failure in SLC examination is also failure in mathematics too. To avoid the concept of pass fail in SLC examination letter grading system was implemented in technical stream last year and planned to implement on both stream from this year but there are a lot of positive and negative comments, views, perceptions about it in Nepal among stakeholders.

This research is a case study about the burning issue letter grading system and aims to find out perceptual difference among mathematics teachers, students and

parents towards LGS in relation to improve student's mathematics achievement and analyze/explain the effects of LGS in motivating students to learn mathematics. To meet the objectives of the study the researcher collected data from two schools of Kathmandu district, Janasewa Higher Secondary School, Kirtipur as government school where there was implemented Letter Grading System in technical stream last year and Panga Secondary School as Boarding School. Data were collected through School Document about TSLC result 2071 of selected school, Interview Guideline (Appendix A, B, C, and F) and FGD Guideline (Appendix D, E). The main respondents of this study were purposefully selected mathematics teachers, students and parents of both schools. Researcher collected data in audio form through Focus Group Discussion among 4 groups of students, each group including 8 students, teacher's, student's parent's in-depth interview. The researcher collected data in audio form by mobile phone and also noted in field note. The primary data were firstly transcribed in respondents' own language then translated in English. After that coding, categorizing and finally theme was made. Vivo coding, narrative coding, value coding and theming the data were used for analysis of data. The result of the collected data was analyzed in the following main five sections/ topics:

- Analysis of TSLC Result 2071 of Selected School
- Common and Difference in Perception towards Letter Grading in Mathematics
- Perception and Practice Relation
- Perceptual and Motivational Variation
- Motivation and Practice Relation

Analysis of TSLC Result 2071 of Selected School

At First, the researcher collected the information and statistical report of TSLC result 2071 of Janasewa Higher Secondary School. Mark ledger, mark sheet of students and other necessary school documents were collected and consulted. The result of technical stream of this school in SLC examination last year is presented in the following table.

Table 4.1. TSLC Result 2071 of Janasewa H.S. School

Grade	Students in Total	Students in C. Mathematics
A+	9 (24.32)	1 (2.71)
A	11 (29.73)	4 (10.81)
B	17 (45.95)	9 (24.32)
C	-	7 (18.92)
D	-	9 (24.32)
E	-	7 (18.32)
Total	37 (100)	37 (100)

(Note: Numbers in parenthesis indicate percentage)

***(Source: Mark Ledger of TSLC Result 2071, Janasewa H.S. School*)**

From the above table, there is vast difference and variability between the grade distribution in total and in math. Nearly half of the students (46%) got B grade and around 24% and 30% students got A+ and A grade respectively. While in mathematics, most of the students got medium and low grade. Approximately 3%,11%,24%,19%,24%,19%,18% students got A+, A,B,C,D and E grade in mathematics respectively. Nine students (approx. 24%) students got A grade in total but only one student (approx.3%) got A+ in mathematics. This shows that, there is vast statistical difference between the percentage of students getting A+ grade in total and in mathematics. There is such vast variability between the result as whole and in mathematics is that, in technical and vocational stream, there are mostly practical subjects in which student can get good marks and grade contributed to reach into higher grade compare to mathematics. Similarly 11 students (approx. 30%) got grade

A in total result but only 4 students (approx. 11%) got grade A in mathematics. This raised the issue of effective teaching learning of mathematics. There are approximately 3%, 11%, 24%, 19%, 24%, 19% students got A+,A,B,C, D and E grade in mathematics respectively. This can also be analyzed that approx. 3%, 11%, 24%, 19%, 24%, 19% students of Janasewa School who are evaluated by letter grading last year are outstanding, excellent, very good, good, poor and very poor in mathematics respectively. While 9 students (approx. 24%), 11 students (approx. 30%) and 17 students (approx.46%) are outstanding, excellent and very good in total result respectively. Around 45% students got D, E grade in mathematics while no students got C, D, E grade in total result. There was not satisfactory result in mathematics. Only few students were found bright in mathematics. This is disappointing. Nearly 19% students got E grade in mathematics. If those students were evaluated by existing pass fail/percentage system, 19% students were sure to fail and also some students who got D grade (below 32 marks) were also became fail in SLC examination in this school. From this, it seemed that the failure number would come out to be significant.

It can also be analyzed from the positive perspective that due to the implementation of Letter Grading System, nearly 40% students are not stopped and blocked at SLC by the barrier of failure in mathematics. It is not necessary for all students to study math and science after SLC. Students can study the subject of their interest which is boon for poor students that without being good in mathematics they can have also got the opportunity and access for further study. The researcher also found the great hidden fact that there is a problem of information gap between students and school administration and teachers. During the time of focus group discussion among the students of Janasewa who passed TSLC last year, most of the students were not satisfied with their grade in mathematics. They said, "We wanted to take re-examination if there was the provision of it for upgrading but we were not informed about it from school and teacher." But mathematics teacher of Janasewa said, "We had informed students about the re-exam and upgrading system at the start of academic session but did not inform after result published." There was found that students were not well informed about re-examination and upgrading system. It is concluded and suggested to the schools that it would be better to give well information and knowledge to the students about the new measurement and evaluation system. Students should know how they are evaluated in letter grading

system. But there was found lack of clear understanding and knowledge among teachers too. There was not any information about LGS to practice it in school. There were a lot of misunderstanding and misconception among teachers too. That's why MoE, NCDEC, CDC, OCE and other concerned bodies should provide training, orientation and other programs and information to teachers, students and parents. Letter Grading System should be implemented by avoiding all negative perception and thinking among stakeholder and by providing clear and right information and knowledge. After that, there will increase positive perception, thinking, believes and attitudes among all stakeholders towards LGS, which ultimately increases and enhances the students' motivation, attention, enthusiasm to their study and also increases the mathematical achievements of students.

Common and Difference in Perception towards Letter Grading in Mathematics

Perception is the ability to see, hear or become aware of something through the senses. It is the way in which something is regarded, understood or interpreted. Perception is the ability of the way to understand or notice something easily using one's senses.

The discussion about the letter grading and perception of different stakeholders towards its need is analyzed first. The researcher asked the questions to every respondents why letter grading is needed? Why should existing pass fail or numeric system be replaced? The responses from all the respondents i.e. teachers, students, parents are almost similar/same. Mathematics teachers of Janasewa Higher Secondary School at technical stream said,

> "Do not stop any students to study further because of the failure in mathematics or in particular subject in SLC examination. Mathematics may not be necessary for every students in the further study. Development of vocational and practical education instead of theoretical education solve the unemployment problem."

The similar view was found from mathematics teachers of Panga Secondary School. There are two mathematics teachers in Panga Secondary School, one teaches compulsory mathematics and other teaches optional mathematics. They said that the government needed to increase the literacy rate of country, stop suicide, develop

skillful education, there is required SLC pass to get driving license, in police, army too. For this no students should be stopped at SLC. Students and parents of both schools also have the same view/perception as teachers have.

Rupa Shrestha is studying at Janasewa in technical stream has got 90 marks in mathematics in first term examination of school. Her father is also a teacher of higher secondary at this school. He said,

> "Government has implemented LGS to attract foreign donors in education, do not spoil educational investment of nation and increase flow of students in higher secondary level and colleges, do not block or stop student at SLC due to failure in particular subject. Letter grading is safe landing for government, school, teacher, parents."

From the above views about the LGS, different stakeholders/respondents have the same responses. They are conscious about the need of alternative evaluation system. They are guided by alternative and vocational education. There is blame/criticism to our education system 'Universities are the factories to produce unemployed manpower.' There is negative perception towards current education system nowadays. So, from the perception of respondents, it was seen to develop vocational and technical education instead of pure theoretical education. For this, letter grading system may become milestone as alternative assessment system.

Mathematics teacher of technical stream of Janasewa School had got basic training and orientation about letter grading system from District Education Office (DEO) and Ministry of Education (MoE). He is very young, energetic, curious and interested to teach mathematics .During the interview he said,

> "Grading is better than percentage system, relative grading is better than absolute. I'm positive about LGS and highly positive if government clarifies and avoids the misconceptions, illusions and misunderstandings about it among stakeholders. LGS should be implemented in both stream all over the country. I am dedicated to my duty before and after grading was implemented. I completed course not skipped any chapter."

Also the Students of Janasewa who were already evaluated through letter grading system last year said that competition among students is not decreased after grading, from GPA it is known whose score is higher or lower.

From the above statements, it is found that teacher who has got training, information, knowledge about LGS are positive towards LGS and adds positive value to LGS. He has positive and wider perception, knowledge about Letter grading. He is dedicated to his responsibility, aware about the positive aspects of grading system. Likewise, students were also positive about LGS, they also gave positive value towards LGS because they were informed about LGS from media, school, and mathematics teacher.

But mathematics teacher at general stream of Janasewa Higher Secondary School have got only TPD training but not any training and orientation about grading said, "Grading means converting marks in to letter. It merely increases quantity but decreases the quality of education. Percentage system is better than grading." From his view, he has only negative and narrow perception about LGS because he has not got any training, orientation and knowledge about LGS.

The same view/perception was found from the mathematics teachers of Panga Secondary School. Optional mathematics teacher of Panga Secondary School is young, energetic and curious to teach mathematics and said,

> "Grading means giving grade by meeting fix standards according to student's capacity, ability in each subject. Grading do not stop student by boarder of pass fail, decreases unhealthy competition among students and school, avoids the problem of suicide because of the failure in SLC examination. But in mathematics percentage is better than grading, grading stop the study habit of students, decreases the quality of education."

From his views, he has a mix responses and perceptions towards grading. He has a positive perception in some aspects and negative perception in other aspects of letter grading. His thought is relative than absolute towards letter grading.

Compulsory mathematics teacher at Panga School said,

> "I'm not well known and informed about grading. There is no any information to our school. I heard grading from next year not from this year. Percentage is better than grading, grading is better for overall country but not for student. If letter grading system is implemented, teacher may not feel fear that any student fail in his/her subject. Students may also skip some hard chapters/topics of mathematics."

From these two views from private school mathematics teachers, it was seen that some mathematics teacher is more knowledgeable, informed and has wider view about LGS than other teacher even though both teacher are not trained about letter grading. From these four mathematics teachers of both schools, it was found that two teachers understood or perceived wider meaning of letter grading but other two teachers had very narrow understanding, conception, and perception about letter grading. Similarly, only mathematics Teacher of Janasewa at technical stream had positive attitude, perception about LGS whereas other three teachers were not positive about LGS. It is so because mathematics teacher at technical stream have got training, orientation, knowledge about LGS but other three teachers who teach at general stream have not got any training, orientation, knowledge about LGS.

Students of technical stream of Janasewa who passed TSLC last year and Studying TSLC this year have got more information and knowledge about letter grading than those students of both schools who are studying SLC at general stream. But there is almost similar perception/understanding about grading system among students of both schools. There are three types of students in every class i.e. talented, average, less talented (weak) in mathematics. During the group discussion and personal interview with students there came three types of responses, perceptions towards letter grading.

Tara KC passed TSLC last year from Janasewa with A+ grade and got A grade in mathematics. He said,

> "Both system are good. In percentage system we can show our marks, percentage, position but not in LGS. People easily understand marks, percentage but do not understand letter, grade. Some people asked me during

> the period of result, what is your result? What Percentage? I said A+. But nobody understood it and asked me what A+ means is? Which division? "

Similar views was received from the students from same school who are studying technical subjects this year.

Seven students out of eight in a group of purposefully selected students of Janasewa who are studying at general stream in class 10 have passed first term exam with high to medium scores were in favor of percentage system ,they said,

> "In grading 60, 65, 69 marks in mathematics lie on same grade B, but in percentage these marks are first division marks as well as it is known whose marks is high and low, if failure in mathematics study next time or give re-exam, get good marks, percentage and get admission to reputed college .Grade D and E are not acceptable in college".

But one student who failed in mathematics with very low marks was in favor of letter grading system. He said, "I do not study mathematics after SLC. I want to study vocational subject." From these views of students, it is seen that students are guided by their career choice and meritocracy. They have fear of not admitted in college if get low grade or marks. They give emphasis on numeric system to show their merit such as percentage, marks and position.

Hem Bhatta is studying in class 10 at Panga School. He got full marks in compulsory mathematics in the final examination of class 9 and have got full marks in C. mathematics in first term examination of class 10. He said, "Percentage system is better than grading system. I deserve my position, can show my marks and percentage but if grading is implemented all students who got 90 above marks get same grade A+."

The above views from the talented and bright students in mathematics as well as in whole clarify that bright students are not in favor of letter grading. They are guided and influenced by meritocracy. They want to show their merit, marks, percentage and position.

Sita Neupane passed TSLC with A grade in total and D grade in mathematics. She said," Grading is better than percentage."

It was seen that students who are less talented in mathematics are in favor of LGS, give value to LGS and want to pass SLC anyhow. They have less interest in mathematics and do not want to study mathematics further, interested to study vocational and technical subject where there is less use of mathematics or used only basic mathematics. It was seen that student are guided by Holland Theory of Career Choice. Different students have different choice, interest, and dream according to their career choice. They have different perception towards education system and measurement system. There was relative not absolute perception among various types of students.

The parents also have different perceptions towards letter grading, it depends upon the student's category also. Parents of talented, average, less talented students have different perception about their child's study, mathematics achievement, and evaluation system. Gita KC mother of Tara KC is just only literate and housewife. She said,

> "Mathematics is valuable in our daily life as well as in further study for student. There is no difference between Letter Grading and Percentage System. Both are same. Percentage is better to show marks, percentage, and position. Grading is also better for poor students, no blockade for further study, controls suicide committed by failure students in SLC examination. My son gave continuity in study before and after the implementation of letter grading system, he is interested in math and science, study a lot. He is laborious and do self-study more. I'm satisfied with mathematics teacher."

Puspa Maharjan is studying at Panga Secondary school at class 10. Her mother, Mamata Maharjan is educated, studied up to PCL and is working at finance company. She said,

> "I have not heard about letter grading before now. Puspa is weak in mathematics, have got 25 marks out of 50 in first terminal examination. She only watches TV, study a lot only at the time of examination period. Other

time do only home work. I'm searching for mathematics teacher for tuition. Please sir see her."

After telling about both percentage and letter grading system from researcher, she replied that grading is better than percentage. She also said, "Puspa wants to become a staff nurse. She is less interested in mathematics and science." Puspa is weak in mathematics, she does not practice or study sufficient. From her mother's interview it is seen that she only study at the exam period. There is no continuity in her study. There is lack of time management in her study. Her mother favors letter grading than percentage system because she may thought her daughter can easily pass SLC. She was also guided by Holland's career choice Theory. It was seen that mathematics is not the choice of all students. Students who are less talented in mathematics have little interest in mathematics. They are interested to study vocational and skill oriented education after school education.

From these two parents, it was seen that there is vast gap between them about the understanding towards their child's study, education as well as evaluation system. Tara is talented and passed TSLC last year from Janasewa with A+ grade. He is talented in mathematics. From her mother's interview, it was found that he is laborious students, continue his study before and after the implementation of LGS. His mother also has mixed and relative perception towards LGS. She was informed and have some knowledge about grading and percentage system. She had knowledge about both advantage and disadvantage of both system. From her views, it can be said that parents of laborious, talented students have relative, mixed but not absolute view about any system. They did not feel any difference between both measurement systems. But parents of talented students in mathematics also guided by meritocracy and their own personal philosophy. They feel proud to show their child's success, they gave less value towards letter grading but gave more value and emphasis on existing percentage or pass fail evaluation system.

Comparing the views of above two parents, it was seen that parents of less talented students in mathematics have opposite perception than that of talented parents of talented students. There was found such vast and opposite views about LGS between students and patents of both schools because of practice about it too. It was

implemented in Janasewa School from last year but not yet implemented on Panga School.

Perception and Practice Relation

Practice means to do something again and again in order to become better at it, to do regularly or constantly, to perform or work at repeatedly so as to become proficient. Perception is also the ability to understand or notice something easily. There is also a strong tie or relation between practice and perception. Perception depends upon the practice made and practice is done according to the inner perception. In the history of Secondary education of Nepal, letter grading system is a new and alternative practice in the field of evaluation and assessment. LGS was implemented only on 99 technical and vocational stream schools since last year and is going to implement on both stream schools all over the country from this year. (MoE Report, 2015). In this section, the researcher discussed and analyzed the practice made by schools, teachers, and students from their side towards LGS and in mathematics learning.

In the first case school, Janasewa Higher Secondary School there has been implemented letter grading since last year on technical stream. But there is not practiced LGS in internal class or exam yet. The researcher asked the questions to mathematics teacher at technical stream of Janasewa, Had you practiced LGS in internal class or internal examination of school last year? Are you practicing this year? He answered,

> "No, in our school we did not use LGS in internal class or school exam. We have not got any information from any concerned bodies to practice/use letter grading in internal examination of school. It is hard to calculate GPA. But we have software to calculate it. We gave marks, percentage, but did not give grade on mark sheet. This year too."

After that the researcher asked: Why it is not practiced in school? He replied

> "If we use letter grading in internal class and internal examination of school, students do not study seriously. They stop to study and do less practice. So, we are still practicing existing pass fail system. We allocate 40 as pass marks in

> 100 full marks in internal examination of school. Students study seriously because of fear about failure in examination."

But he also said, "Grading is better than percentage system. It should be implemented in both stream all over the country. New system should be conversant but it takes time."

From the focus group discussion among students of both stream technical (last year and this year) and general of Janasewa school, it was found that student were given marks and percentage only, not grade in internal examination of school.

There was seen continuity to percentage system in school practice. It was found that there is not still believe towards letter grading whether it improve or does not improve student's achievement. There was found three reasons, one major covert and hidden reason and two others overt and minor reasons of why there have not been practiced letter grading in internal examination of school in technical stream yet. There is negative perception and belief towards letter grading system in relation to improve student's mathematical achievement. School administration and teachers have thought that if they practice letter grading, students do not study seriously, become careless to their study, feel free and there is no fear about failure in examination. There is the perception that student's achievement is not improved by LGS. This is the major, covert, hidden reason behind it. Hard to calculate GPA and no information from concerned bodies are other minor, overt and saying reasons.

In second case school, Panga Secondary, LGS was not implemented last year. During the time of interview the researcher wanted to know about school practice about alternative assessment system and grading system. Compulsory mathematics teacher of this school said,

> "In our school we are practicing grading on pre-primary, CAS on primary. There is separate math department in our school. All works about mathematics is done through approval of depart. We have also practiced extracurricular activities such as mathematical game, quiz contest etc. Our school recently won valley wise quiz contest. But have not practiced letter grading on class 10 because we have no information from District Education Office about it. Does it from this year? I heard it from next year. Not fixed."

He also told that he heard a surprising news on newspaper; there was an advertisement of some technical school by publishing students name with their photo of getting 94%, 90% last year. They converted GPA and grade into percentage by multiplying GPA with fix number.

From his view, it was found that school have been practicing alternative ways, measures of education and evaluation system in lower classes but have not practiced letter grading at secondary level because of not fixed policy about it. It is seen that last year some technical school advertised by converting GPA into percentage. These school are still in favor of percentage system. They want to give continuity to existing measurement system. There is lack of information and knowledge about grading among stakeholder.

From the focus group discussion among students, students of all 4 groups of both schools said,

> "Mathematics is easy if practiced, hard if not practiced. We have given a lot of homework. Go to coaching class too. So we have lack of time. We have not extra time to practice mathematics. Geometry is hard. If we study it from lower classes, it becomes easy. What is theorem? We have not heard theorem before Grade IX. Do not understand theorem at Grade IX, little at Grade X."

It was found that there was lack of time management to study mathematics. There is load of assignment, so students have lack of time to practice mathematics. Almost all students feel geometry hard because there is little course of geometry in lower classes. Basic concept of geometry should be kept on the course of lower classes. Then students do not feel geometry hard.

Students of Panga, "There is not any fixation about grading. If it is fixed, talented students study hard to get highest grade in mathematics and less talented/weak students study little by thinking pass SLC without hard study, no fail in SLC." Since there is not any decision about letter grading system, there is not any practice about it. Because of lack of practice about it, there was only negative perception among teachers, students and parents too. It needs practice or to become customary to develop clear understanding, perception about any system.

Perceptual and Motivational Variation

The motivation of students depends upon their perception towards certain person, object, thing, and system. To achieve the objective of study, the researcher analyzed the variation between perception and motivation towards letter grading system. There was three types of students in mathematics: talented/bright, average/middle and less talented/weak. These three types of students have different perceptions towards letter grading even though they have certain common perception towards it. The researcher had done focus group discussion among 4 groups of students and took personal interview with some students as well as with their parents. Students were found motivated and assisted mostly by their parents and also by mathematics teacher for mathematics learning and study. They said, "Home environment is good. Parents encourage to study mathematics and other subjects too."

"We are satisfied with mathematics teacher, he teaches us by giving basic concepts, examples, not only rote formula. He encourages us and give feedback in our mathematics learning."(Students of Janasewa H.S. School)

> "We easily understand mathematics taught by optional mathematics teacher but it is difficult sometime to understand mathematics taught by C. mathematics teacher. Opt. mathematics teacher teaches by giving sufficient examples, basic concepts but C. mathematics teacher gives few examples and little basic concept about mathematical problem, only says rote the formula and apply it." (Students of Panga S. School)

From the above statements from students groups, it is seen that students of both schools are motivated by parents to their study of mathematics. Students of Janasewa are also motivated by mathematics teacher to learn mathematics because he teaches by giving basic concepts, examples. But students of Panga are more motivated by Opt. mathematics teacher as well as C. mathematics teacher but there is some learning difficulties due to lack of clear understanding by students. From above expressions it can be said it is better if teacher teaches according to the psychology, need and interest of students and by clarifying basic concept giving sufficient examples.

Three types of students have three types of perceptions towards letter grading. Like the perceptual variation among students there is also motivational variation. Talented students in mathematics have mixed opinion towards LGS. They Said, "Both system are same, no difference. In percentage we can show our percentage, marks, position but can't show on LGS. So, numeric/percentage system is better." Average students in mathematics also said that both system is same. They are neutral towards any assessment system. Less talented students in mathematics said that letter grading is better than percentage system. "We can easily pass SLC examination. We do not study mathematics further. Napadhera pass hune ho sir letter grading vaneko."

Most of the students of both streams of both schools said, "After the implementation of grading system each students can study further, no block for further study and study the subject of interest. Grading is better for poor student but loss and not beneficial for talented students in mathematics. "

Focus group discussion was done among 4 group of students, each including 8 members. From the group discussion among students, there is not absolute perception about LGS among students, there is relative perception about it. Similarly, student's motivation depends upon their perception. It was seen that talented students is not motivated and attracted towards LGS. Talented students in mathematics are in favor of percentage system, motivated and interested in mathematics guided by meritocracy and Maslow's self-actualization need and have highest grade target/need whereas there is little motivation among average students in mathematics learning. But less talented students in mathematics have negative, false conception and perception, illusion about LGS and are attracted towards letter grading by negative philosophy and perception.

Students of Janasewa who passed TSLC last year said, "Getting low grade in mathematics does not effect. If colleges admits, study other subject. Why to get high grade in mathematics? Why to study mathematics?" from this view it can be said that student are guided by different career choices, all student do not want to study mathematics further. It is not required to get high grade in mathematics if colleges admits to other subject. Student can study subject of interest. But during the group discussion among them, they also responded, "Mathematics is very useful subject. Basic concept, formula which we learned at school level are applied now. In

Engineering mathematics is essential." From this opinion of students, it is analyzed that mathematics is essential in science and technological subjects such as Engineering. Students are guided by Holland Career choice theory and have attraction towards mathematics learning.

Similarly students who are studying technical subject at Janasewa have also mixed response towards mathematics learning and letter grading system. Those students who are poor in mathematics said, "Grading is better. We are not failed in SLC examination. No difference, if we get low grade in mathematics. We do not give re-exam to upgrade. It is not required to know math in detail. We do not study mathematics further. Man who study mathematics and science become crazy and mad." But those who are bright in mathematics said," Percentage is better than letter grading, in grading it is not known who is first, second and third. Mathematics is useful for further study in science and technology. We want to study Opt. mathematics also but not in our course."

By comparing these two statements of students, it can be analyzed that different students have different perceptions towards mathematics learning and letter grading. There is also motivation variation among students. Those students who are weak/less talented in mathematics have little interest in mathematics and mathematics is not their career choice and they favor LGS than percentage system. They are distracted to mathematics learning by grading system. They have misconception about grading that pass without study. But those students who are talented in mathematics want to study extra math. They have deep interest and attraction to study mathematic but it is not by LGS. They favor percentage because to show their merit. They are high need and motive in mathematics.

Similar result was found from focus group discussion among students who were studying at class10 at Janasewa H. S. S. at general stream. Out of 8 students, 7 students on group who passed in mathematics in first term examination said, "Percentage is better" but one students who failed first term examination said, "Grading is better." But all students had same voice, "grading means give grade according to capacity of a student in particular subject. No students fail in SLC examination. Isn't it? D, E equivalent to fail, rejected and do not get admission at college. Similarly, in grading competition among students decreases."

Hem Bhatta is studying at class 10 in Panga Secondary school. He has got full marks on mathematics in final examination of class9 and first term examination of class 10. He said, "Percentage system is better than LGS. In percentage, I can show my marks, position but can't on LGS. Above 90 marks is given A+ grade but whose marks is high and low is not known. After SLC, I will study science." From his personal view, it is seen that talented students are in favor of percentage system and guided by Maslow's need theory and Holland career choice theory. He has highest need and feel proud to show his marks, percentage, position and merit to other. From his view, it is seen that he has high interest and attraction to mathematics learning but by hearing about the implementation of letter grading system his attention is diverted.

In Panga school, 7 students out of 8 in group formed said, "Percentage is better, D and E grade are not accepted in college, equivalent to fail, cannot get admission to college." But one student Ramesh Tharu, who has got 20 mark in 50 full marks in mathematics and last position said, "Grading is better. I have to pass SLC. I study management after SLC, do not study mathematics and science." From these perceptions of students, it can be analyzed that students are aware about their personal career and most of the students are in favor of percentage system than LGS. Students have less attraction towards LGS except less talented students. There is fear of rejection after SLC if get low grade. They are guided by Holland's career choice theory. Less talented/weak students have low need in mathematics, they want to improve their mathematics, and pass SLC. Low achiever in mathematics are also motivated by Maslow's theory with lowest level of need and want to improve their mathematics and desire above need. They are also guided by Holland's Career Choice Theory. They have less interest in mathematics and have other subject as career choice. Less talented/weak students in mathematics have negative perception about LGS because of lack of knowledge, orientation about letter grading.

Motivation and Practice Relation

Motivation and practice have direct and indirect relation. There is also a famous saying that 'Practice makes man perfect'. Practice increases motivation as well as motivation increases desire to practice something. Measurement system is not absolute. It is relative. Similarly, life is not same for each person. Each person has different interest and motives. Everybody does not become doctor, engineer, pilot and higher academic person. There are different options after school education. There are

different survival philosophy. Everybody needn't to study mathematics further. Mathematics is interested for someone but bore for other. There are three types of learner in mathematics: talented, average and less talented. They have different rate of interest and motivation in mathematics. All should not study mathematics and science after SLC. Those students who are less talented in mathematics can go to vocational education, language subject, different short term and long term skill training program, hotel management, reception, typing etc. So students should not be stopped in SLC examination by the barrier of failure in certain subjects. The researcher conducted FGD among students and took interview with some mathematics teacher, students, and parents. Till the time of data collection, there is not done any fix decision about implementation of letter grading in SLC examination by Government. But after the data collection and at the time of data analysis, there came a decision from MoE for the implementation of letter grading all over the country in both stream.

Out of four groups, only one group of students who were already evaluated through LGS in TSLC examination last year from Janasewa and are studying engineering at same school said,

> "Competition among students is not decreased among students, from GPA it is known whose score is high and low. Motivation to learn mathematics is also increased after the implementation of letter grading. Student who is getting B grade in mathematics wants to get A, who is getting A wants to get A+. There was not any disturbances in our study habit before and after the implementation of letter grading. We studied mathematics constantly, practiced a lot before and after the implementation of LGS. Teacher did not skip any chapter and topics of mathematics. We also studied all topics of mathematics."

But students of other three groups of both schools said,

> "In grading, competition among students is decreased. There is not known marks and percentage in LGS, whose score is high and low. Who is the first, second, third is not known. Above 90 marks lie on A+, all students who get above 90 marks are in same category. Grade D, E are equivalent to fail, colleges reject and don’t give admission to D, E grade."

From these two types of perceptions towards LGS, it is seen that students who were already evaluated through LGS became habitual and more knowledgeable about LGS than other three groups. It can be analyzed that motivation depends upon the perception and perception depend upon the practice made. Those students who are habitual about grading practice have positive perception, so they felt competition among friends in classroom to learn mathematics. As mentioned in Maslow Hierarchy of Need Theory, they were also attracted and motivated to mathematics learning after letter grading was implemented to get high grade in mathematics. But those students who are not habitual about LGS, are only guided by meritocracy and Holland theory of Career choice. Students have fear of not getting admission to college if get low grade. There is lack of clear information and knowledge about LGS among teachers, students and parents. There is misconception, misunderstanding and illusion towards LGS among most of the stakeholders.

There was implemented letter grading at Janasewa School in technical subject in SLC examination last year but was not practiced by school in internal examination of school.

During the time of interview, mathematics teacher at technical stream of this school, Said,

> "Grading is not practiced in internal examination of our school. We gave marks, percentage only on mark sheet but not grade. We have no information. We have informed about re-examination and upgrading system at the start of academic session but none of the student came to give re-examination to upgrade their grade."

But students of technical Stream of Janasewa H. S. School who were already evaluated through letter grading last year said, "We were not satisfied with our grade in mathematics, we would give re-examination to upgrade our grade in mathematics but we were not informed about it."

There was seen information gap among students, teachers and school administration of that school. Student were evaluated by existing pass fail system in school examination last year and this year too. It was found that the main reason of it was students stop their study if they are evaluated by LGS. There was not

implemented letter grading on general stream last year. Students of Panga School said, "It is not fixed yet about letter grading. If it is fixed soon, talented student study hard to get higher grade but less talented students study little." From this expression of students, it can be analyzed that students are in confusion about the implementation of letter grading system. But there is a lot of misconception among students about it. Most of the students have the delusion that they pass SLC without study and will not become fail in SLC examination after the implementation of letter grading. But this is not reality, renowned educationist Prof. Dr. Biddhyanath Koirala says that letter grading system does not mean no fail system. Below grade D is equivalent to fail. Grade D (below average) is nearly fail or fail, E (insufficient) and N (non-graded) means failure (Koirala, 2015). Similarly, there is not any attraction towards LGS among students. Talented students are little motivated but guided by meritocracy and favor percentage system. Average students are neutral towards it. But less talented/weak students are negatively motivated. They thought pass easily without hard practice.

Compulsory mathematics teacher of Panga Said,

> "If letter grading is implemented, there increases selection habit among students, they study mathematics by skipping hard topic, high level question, do not study total course because above 90 is A+, need not to get full marks. Talented students do not consult continuously to teacher as previously and less talented/weak students do not study hard if grading is implemented. Similarly teacher also does not feel fear about failure of students in his/her subject and become careless to his/her responsibility."

From his view it implies that teacher and students all have negative perception about grading and there is attention diversion among students to mathematics learning if grading is implemented. There is misconception, misunderstanding among teachers, students and parents towards LGS. So there is no motivation by LGS and only negative believe and perception among all stake holders.

Similarly, about the problem of marginal grade or score all teachers have same view.

"Marginal and low grade in mathematics can be improved by giving re-exam. This also maintains the problem of quality." (Mathematics teacher at technical stream, Janasewa H.S.S.)

"Marginal case is obvious and natural in every measurement system. It should be solved by round off method." (Compulsory Mathematics Teacher of Panga School)

From these two views of mathematics teachers, it can be analyzed that marginal grade problem is obvious. Marginal grade and low grade e.g. D, E can be solved by giving re-exam if student is not satisfied with his/her grade in particular subject. This system also maintains and increases quality of education and avoids the psychological tension, pressure, fear about the rejection by college, if get low grade D and E in mathematics or in other particular subject.

Chapter-V

SUMMARY, FINDINGS, CONCLUSION AND RECOMMONDATIONS

This Chapter provides a brief summary, states the findings, gives conclusion of the results of the study and suggests possible directions for future studies as recommendations.

Summary

This research study entitled, "Letter Grading System: Perceptual Difference and Student's Motivation to Learn Mathematics" was done to achieve the following objectives:

- To find out the perceptual difference among mathematics teachers, students and parents towards LGS in order to improve students mathematics achievement.
- To analyze/explain the effects of LGS in motivating students to learn mathematics.

The research design was qualitative and case study type and conducted in purposively chosen two case schools from Kathmandu district: Janasewa Higher Secondary School, Kirtipur as government school where there was already implemented letter grading in technical stream last year and Panga Secondary School, Kirtipur. To achieve the objectives of the study, data and information were collected through FGD among four groups of students each consisting 8 members, 3 group were formed from Janasewa School and one group from Panga School. In-depth interview with mathematics teachers, those students selected for focus group discussion and parents of both schools and respondents were also taken purposefully. The school documents and records of TSCL result 2071 of Janasewa H. S. School was also collected and consulted. Maslow's Hierarchy of Need Theory and Holland's Theory of Career Choice were used to analyze the collected data and interpret the meaning. Cross-match, comparison and triangulation was done to analyze the collected data from different tools, schools and respondents.

Findings

On the basis of the analysis of the data obtained from FGD Guideline and Interview Guideline, it was found that:

School Context

- Even though letter grading system was implemented in technical stream in SLC examination from last year, the school under this study did not practice LGS in internal examination of school last year and this year too. There is still continuity in percentage system and grade is not mentioned in mark sheet in internal examination of school. There were found three reasons of not practicing LGS in internal examination of school that school and teachers have thought students break the continuity of the study and become careless in their study; no direction from any concerned bodies to practice LGS in internal examination of school, and difficult to calculate GPA.
- In general stream of both schools, LGS was not implemented and practiced yet due to no certainty about it till the time of this research was done.

Teachers

- Only mathematics teacher at technical stream who had got basic training and orientation about LGS, highly favored LGS and had positive perception towards it but other mathematics teachers of both schools did not favor LGS and had negative perception towards LGS because they had not got any training and orientation about LGS.
- There is necessity of training, orientation program to the teachers of both stream.
- Mathematics Teachers of both schools suggested that marginal grade and low grade can be improved, if student is not satisfied with his/her grade in particular subject and in whole. This also helps to maintain the quality of education and avoids the psychological fear among students about rejection and not getting admission to college in higher secondary level. Re-examination is considered as best solution for this issue.

Students

- Most of the students have misconceptions, misunderstandings and illusions about LGS due to the lack of knowledge and clear understanding about letter grading system.
- Students have psychological fear about rejection and do not get admission in college after SLC if they get D and E grade.
- Students of both stream of both schools are highly motivated and assisted by their parents for their study to get better grade.
- Motivation is not only the part of assessment, it goes to teachers' role. Students of both schools are motivated, inspired and assisted by mathematics teachers to their learning.
- Among four groups of students, only one group who were already evaluated through LGS last year of technical stream were in favor of LGS in comparison to other groups.
- Most of the students studying in class 10 in this year have got attention diversion and distraction to their study and mathematics learning, felt less competition among friends after hearing about letter grading system but there was found opposite condition among students of technical stream who were already evaluated through LGS, they were motivated to learn mathematics, also felt competition to get high and highest grade in mathematics, other subjects and in total after the implementation of LGS, did not skip any chapter and topic, studied seriously as previously.
- Students of technical stream who were already evaluated through letter grading were not satisfied with grade in mathematics and wanted to upgrade through re-examination but were not well informed about it from school and teacher.
- Talented students in mathematics, who were studying in technical stream were interested and wanted to study Opt. mathematics (extra mathematics) too but it is not in the course of technical stream till now.
- There are three category of students i.e. talented/bright, average/middle and less talented/weak in mathematics in both schools of both stream. Talented have mixed perception towards any measurement system and mostly favored percentage system because they are guided by meritocracy and feel proud to

show their percentage, marks and position. Average are neutral towards any measurement system. But less talented students are in favor LGS, guided by negative perception like pass without study.

- Talented students in mathematics are highly interested to study mathematics and motivated to get highest grade in SLC examination as well as wanted to show their marks, percentage, and position and interested in science and technology for further study.
- Average students in mathematics had average interest to study mathematics. They were interested to study management, technical and vocational subject in the future and motivated to get high grade in mathematics.
- Less talented students in mathematics had less interest to study mathematics and interested to study other subjects such as vocational, job and skill oriented subjects after SLC, but motivated to get average grade in SLC examination.

Parents

- Parents of the students of technical stream had more positive perception towards letter grading system in comparison to the parents of students of general stream because they had got more knowledge about it.
- Parents of those students who are talented in mathematics had relative and mixed perceptions towards any measurement system and mostly favored percentage system rather than LGS. They felt proud to show their child's progress, position, percentage, marks and merit.
- But parents of those students who are less talented in mathematics were in favor of LGS rather than numeric/percentage system, but not satisfied with their child's achievement in mathematics and wanted to improve it. They wanted vocational and skill oriented education for their child's further study.

From the above findings, it can be summarized, there was perceptual similarities as well as difference, both positive and negative perceptions towards letter grading system among teachers, students and parents. There was found positive as well as negative effects of letter grading system but more negative and less positive effects of LGS was found in relation to the motivation of students to learn mathematics. Except mathematics teacher of technical stream who had got basic training and orientation about LGS, students who were already evaluated through

LGS and their parents, most of the teachers, students who were studying in class 10 this year and their parents had more negative and less positive perceptions towards LGS.

The common and positive perceptions that was found among all the respondents was: after the implementation of letter grading system, no students stopped for their further study because of the failure in particular subject like mathematics in SLC examination, get access to higher studies according to their capabilities, potentialities, interest and choice. It decreases educational wastage and dropout, unhealthy competition among students and schools. It avoids the concept of failure and unsuccessful from the mind of students, which enhances their potentiality and capability. It also avoids the exam phobia, fear, stress and other psychological pressures from students' mind which ultimately improve student's mathematical and other achievement as well as motivates students towards learning.

Similarly, as mentioned above there was found negative perceptions towards the implementation of LGS that it will decrease quality of education, competition among students to their study and motivation towards learning. Students do not study seriously, may not concern and collaborate with teacher for learning as previously, teacher may also become less responsible to his/her duty. Teachers and students both may skip difficult chapters/topics of mathematics because if 90 above is A+ grade why to need full marks (100) if students are evaluated in interval and there is not mentioned marks, percentage and position.

In overall, math teachers, students, parents of both case schools had mix (similar and different) and relative perception about grading system in relation to improve student's mathematical achievement and motivate to learn mathematics. Most of the Teachers, students and parents of private school were more favored existing numeric/percentage in comparison to government school excluding some less talented students.

There was found attention diversion among students except those who were already evaluated through LGS in mathematics learning after they heard about the implementation of letter grading in SLC examination although students are motivated to get high grade in mathematics. Talented students are motivated to get highest grade

i.e. A+, average are motivated to get high grades i.e. A and less talented students who are getting low marks in mathematics are motivated to get medium grades i.e. B and C in mathematics.

Conclusions

This case study research tries to find out the common and different perceptions among the mathematics teachers, students and parents towards LGS in order to improve student's mathematical achievement and explores the effects of LGS in motivating students to learn mathematics. From the minute analysis, interpretation and findings, the researcher concludes that merely change of the measurement system without proper discussion, sufficient dissemination, converting marks and percentage into letter at the last stage of typing mark-sheet neither motivates students to learn mathematics, improves student's mathematical achievement nor solves the current educational problem. Based on national and international practices about letter grading system, it means not only converting marks and percentage into letter or alphabet at the time of result publishing but also it is wider and comprehensive testing tool/mechanism, measurement and assessment system and decision making process. But in the context of our country Nepal, letter grading system in SLC examination is limited to converting marks and percentage into letter at the final stage of typing mark sheet. Grade in particular subject should be given based on all the potentialities, capabilities of a student and the fulfillment of learning outcomes prescribed by curriculum. Three hour paper and pencil test cannot measure all the potentialities and talents of a student. So, overall existing testing, evaluation mechanism and process should be changed.

In existing situation, there is almost negative perceptions, misconceptions, misunderstandings and illusions among teachers, students, and parents towards letter grading system due to lack of sufficient information, knowledge and popularization among all stakeholders. Schools and teachers are not sure and do not believe in grading system whether it increases or decreases student's mathematical achievement and learning. So, MoE, CDC and other concerned bodies should try to avoid the negative perceptions, misconceptions, misunderstandings and illusions that remain in the mind of teachers, students and parents towards LGS through discussion, orientation and other programs about it through media. The researcher comes to the

conclusion that government, MoE, CDC and other concerned bodies should give information about the implementation and how to practice it in internal examination of school. The researcher found that only mathematics teacher of technical stream has positive perception about grading system because he has got basic training and orientation about LGS but other teachers have negative perception and misunderstanding about LGS due to lack of sufficient information and knowledge. So, the researcher comes to the conclusion that perception about any system, process and event depends upon the knowledge and clear understanding about it. So, there is necessity of training, orientation and discussion programs about the assessment system, school evaluation system and letter grading system.

There was found mix and relative responses and views among students according to their categories. Talented, average and less talented students have motivated to get highest, high and average grade in mathematics and in total respectively which is a positive effect of letter grading system. This positive effect should be continued. From this, the researcher also have drawn the conclusion that in the context of introducing letter grading system as a new and alternative assessment system, students should also be informed and clarified about this system how they are evaluated. It is also concluded that MoE, NCDEC, CDC and OCE should address the voice of talented and those students who deserve different/extra than other/general which motivate students by increasing the feeling of competition among them.

Most of the students of technical stream are interested and wanted to study Opt. mathematics but there is not Opt. mathematics in technical course. So, it is concluded that CDC should address students need and incorporate extra mathematics in technical course too. Except some talented students, most of the students of both stream, schools and years felt geometry hard. So, the researcher concluded that, the concept of axiom, reason, facts, theorem and other basic concept about geometry should also be included in curriculum and text book of lower level too. The main conclusion which the researcher drawn is that letter grading system should also be implemented not only in SLC examination but also in other lower and higher level too and should be practiced in internal examination of school which help students to become familiar and habitual towards LGS. After LGS become popularize and habitual, there will develop the positive perception towards it and students also

become motivated towards their learning which ultimately enhances learning outcomes and increases mathematical achievement of students.

The letter grading system can solve the existing educational problems such as suicide, dropout, educational wastage, unhealthy competition and promote the educational investment and co-operation among students and schools. No students is stopped in SLC examination by the failure in particular subject. All students can be accessed to further education according to their interest and choice. All students needn't to study mathematics and science further. So, from the findings, it is also concluded that government, MoE, CDC, HSEB, and Universities should launched and design the alternative courses, vocational and technical education, short term and long term skill oriented education which can solve the current and burning problems of unemployment.

Recommendations

From the findings of the present study, the researcher suggests the following recommendations:

Recommendations for the Educational Implications

For the improvement, the researcher recommends and suggests that MoE, CDC and all concerned bodies should disseminate proper information and conduct training, orientation, seminar and so on for the teachers for how to practice LGS in school evaluation system and awareness programs for the students and parents to avoid the misconceptions, misunderstandings, illusions and negative perceptions towards LGS which is in their mind. There should address the students' voice of showing their percentage, marks, position and merit. Concerned bodies should try to maintain quality of education not only quantity. There should be designed and offered technical, vocational, job and skill oriented courses instead of theoretical. By developing crystal clear and positive perception, making customary among the stakeholders and implementing from the lower class to higher, LGS will become effective, dear and popular. After that, it will decrease educational wastage, maintain quality of education, increase student's motivation towards mathematics learning and get high achievement in mathematics and in other subjects. Some of the recommendations for the educational implications are given below:

- Teachers of both stream of both schools private and public all over the country should be given training and orientation about assessment system, teaching methods and letter grading system.
- Both Technical and general stream schools should practice LGS in internal examination of schools because if it is practiced in internal examination of school, students become habitual and familiar towards it and become motivated to get higher grade in mathematics and overall in SLC examination.
- Ministry of Education, CDC should inform and encourage schools and teachers to practice LGS in internal examination of school through training, workshop, seminar, orientation and so on programs.
- The misunderstandings, misconceptions and illusions about LGS should be avoided by MoE, CDC, NCDEC and other concerned bodies through orientation, training program, discussion and dissemination of knowledge and information through media among stakeholders about newly introduced measurement and evaluation system.
- MoE, CDC, NCDEC should give proper information about LGS to all schools how to practice it in international examination of school.
- MoE, CDC, HSEB and Universities also design and launched vocational, technical, short term and long term skill oriented courses for further and higher education to address the need of different types of students.
- There aroused the voice of percentage, marks and position in letter grading system mostly by talented students, their parents and teachers too. So, it should be addressed by MoE, CDC, NCDEC and OCE to keep motivation, competitiveness, attention and attraction among students to their learning.
- There should also be kept Opt. mathematics in the course of technical stream for those students who are interested to study extra mathematics.

Recommendations for Further Study

Due to the lack of sufficient time, resources, economic problem and other shortage, this research was conducted only in two schools of Kathmandu district. Therefore, further study can be carried out by sampling various schools from different parts of Nepal. The researcher took two schools one public and another private. So,

the researcher suggests to conduct the comparative study between public and private schools about letter grading and alternative assessment system. Further researchers can also do comparative study about perceptual variation and differences towards LGS between trained and untrained mathematics teacher, teacher from urban and rural area, motivational difference between private and public school students, students from urban and rural area etc. Further researchers are suggested to investigate the impacts on the mathematical achievement of students evaluated by percentage system and LGS. This study was conducted before the decision about the implementation of LGS in both stream, there was implemented LGS only in technical stream schools but not practiced in school examination and internal assessment till the data collection period. So, further researchers are suggested to investigate/explore the effects/impacts of LGS to improve mathematical achievement of students. This study is case study type and qualitative, but further researcher can do survey and quantitative researcher too. This research is also based on policy practice of government of Nepal, MoE, and CDC. So, the researchers of other area and subjects also can conduct further researches based on this study.

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APPENDIX: A

Interview Guideline for Mathematics Teacher

Name: Interview Date:

Age: Sex:

Qualification: Teaching Experience:

School's Name:

The interview with mathematics teacher was taken under the following points/ topics:

- Known or unknown about letter grading system.
- Views/perceptions/concept towards letter grading system.
- Training/orientation about letter grading system.
- Practice of LGS in internal class and internal examination of schools.
- Problems/challenges/issues on implementation LGS.
- Problems that will arise by LGS in mathematics.
- Role of teacher to motivate students in mathematics learning.
- Feelings after LGS is implemented.
- Responsibility and duty in teaching.
- Appropriateness of LGS in SLC examination.
- Comments and suggestion about LGS.

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APPENDIX: B

Interview Guide line for Students who passed TSLC in 2071

Name: Interview Date:

Age: Sex:

Address: School:

The interview with student was taken under the following points/topics:

- Understanding about LGS.
- Home environment to study mathematics.
- Assistance and help at home to mathematics learning.
- Homework and other tasks in mathematics.
- Regularity in school and mathematics classroom.
- Whether Skip or study all chapters/topics of mathematics by students and teacher.
- Continuity in study before and after LGS was implemented.
- Satisfied with mathematics teacher.
- Expected grade before giving SLC examination.
- Grade received in mathematics and as total in TSLC examination.
- Satisfaction from received grade in mathematics and total.
- Study habit and interest before and after the implementation of LGS.
- Feeling of motivation towards mathematics learning after grading was implemented.
- Subject studying now and further study.
- Use/application of mathematics in your study now.
- Mathematics easy or hard.
- Mathematics: interesting or bore and liked or disliked.
- Which is better? Percentage/numeric system or LGS.
- Drawbacks and problems on LGS.
- Comments and suggestions about LGS.

APPENDIX: C

Interview Guideline for Students who are studying in Class 10

Name: Interview Date:

Age: Sex:

Address: School's Name:

The interview with students who are studying at class 10 this year is taken under the following points:

- Understanding about LGS.
- Home environment to study mathematics.
- Assistance and help by anybody to learn mathematics at home.
- Homework and other tasks in mathematics.
- Getting coaching and tuition in mathematics.
- Regularity in school and mathematics classroom.
- Continuity in study.
- Study habit and interest in mathematics.
- Interested subject and further study.
- Mathematics easy or hard, interesting or bore and liked or disliked.
- Satisfied with mathematics teacher.
- Grade goal/grade target for SLC.
- Grade target in mathematics for SLC examination.
- Which is better? Percentage/numeric or LGS.
- Comments and suggestions about LGS.

APPENDIX- D

FGD Guideline for Students who had passed TSLC in 2071

School's Name: Date:

FGD among students who had passed TSCL in 2071 was done based on the following points/topics:

- Perception about LGS.
- Understanding and knowledge about LGS.
- Advantage and disadvantage of LGS.
- Motivated or demotivated from LGS.
- Feeling of competition among students after grading was implemented.
- Expected grade before giving SLC examination.
- Mathematics: easy or hard.
- Mathematics: interesting or bore and liked or disliked.
- Satisfied with mathematics teacher.
- Feedback, motivation from mathematics teacher in mathematics learning.
- Grade received in mathematics and as total in TSLC examination.
- Feelings after result published.
- Satisfaction from grade received in mathematics and total.
- Subject studying now.
- Home and school environment for mathematics learning.
- Which is better? Percentage/numeric or Letter grading system?
- Drawbacks and problems on LGS.
- Comments and suggestion about LGS.

APPENDIX: E

FGD Guideline for Students who are studying in Class10.

School's Name: Date:

FGD among students who are studying at class 10 this year is done based on the following points/topics:

- Perception/views about LGS.
- Information and knowledge about LGS.
- Advantage and disadvantage of LGS.
- Grade goal/grade target for SLC examination.
- Motivation level by LGS in mathematics learning.
- Feeling of competition among students through letter grading system.
- Mathematics: easy or hard.
- Mathematics: interesting or bore and liked or disliked.
- Getting any coaching and tuition in mathematics.
- Satisfied with mathematics teacher.
- Motivation and feedbacks is given from mathematics teacher.
- Motivation and assistance from parents for mathematics learning.
- Home and school environment for mathematics learning.
- Which is better? Existing pass fail/Numeric system or LGS.
- Drawbacks and problems in LGS.
- Comments or suggestions about LGS.

APPENDIX: F

Interview Guideline for Parents.

Date of Interview: Name:

Age: Sex:

Qualification: Occupation:

Address:

The interview with parents was taken under the following points/topics:

- Known or Unknown about LGS.
- Views/perceptions/believes towards LGS.
- Appropriateness of LGS in SLC examination.
- Problems/challenges/issues on implementation LGS.
- Home environment for study.
- Study habits of child.
- Child's interest and regularity to study mathematics.
- Expected grade and achievement from their children.
- Homework and other tasks that is done by child.
- Assistance to child's study in mathematics and other.
- Consult with school administration and mathematics teacher.
- Satisfied with school and mathematics teacher.
- Parental role for getting highest grade and achievement in mathematics.
- Care about child's study.
- Future plan for child's study.